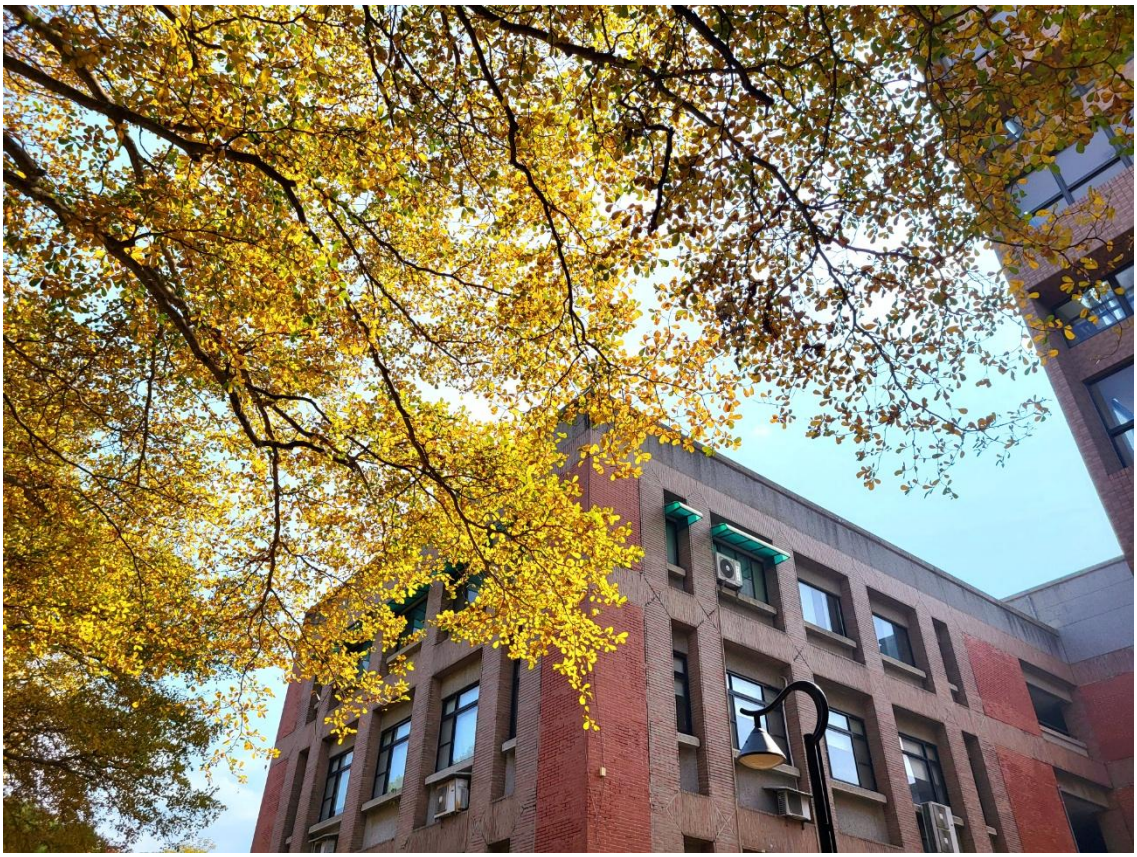
NATIONAL CHUNG CHENG UNIVERSITY

2025 CCU/CoE

INTERNATIONAL INTERNSHIP PROGRAM

COLLEGE OF ENGINEERING (CoE)



國立中正大學工學院
National Chung Cheng University
College of Engineering

2025 CCU/COE INTERNATIONAL INTERNSHIP PROGRAM

In Engineering Field

Continuing the yearly internship program in engineering field, the College of Engineering (CoE) offers on-campus research internships for international university students in 2025.

This project-based program provides an opportunity to better understand CCU's research in engineering and technology. Students may practice their skills in the projects, acquire new competence, and experience a different culture.

PROGRAM BENIFITS

To have an enjoyable and enriching experience in academic study and exchange their ideas of research with CCU students.

INTERN PERIOD

June 1 –December 31, 2025

At least 9 weeks. Individual mentors may have a different definition of intern period. For self-supported interns, the period may not be limited as mentioned above. Please refer to each research topic for precise definitions.

FEES

FEE-FREE. The program fee and registration fee will be provided by CoE.

SCHOLARSHIP

Research topics are offered in two types:
(A) Scholarship and (B) self-supported.
For **type-A**, CCU offers a scholarship of around NT$ 12,000 per month, covering on-campus accommodation, living expenses, and partial airfare. It is the standard amount. The total amount may be amended based on the intern's performance by the project mentor.

PROGRAM ELIGIBILITY

- Graduate school students (master & PhD students)
- University junior students (3rd year or above).
- Those who already complete PhD degree are ***NOT*** eligible to apply.
- Passport holders of People's Republic of China, Hong Kong, or Macau are ***NOT*** eligible to apply.
- Current degree-seeking students, exchange, and visiting students in Taiwanese educational institutions are ***NOT*** eligible to apply.

APPLICATION MATERIALS

1. Online Application Form
2. Curriculum Vitae in PDF format
3. Official Transcripts
4. Letter of Recommendation in PDF format
5. Certificate of language proficiency
6. Research Plan in PDF format
7. Copy of Passport (Bio-page)
8. Head-shot Photo in JPG format (at least 300 KB files ize, 826X1062 pixels.)
9. Other Supplementary Documents(Optional)

APPLICATION

- Applicants should read the requirements of each research topic carefully, complete 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 2025 CCU/COE International Internship**". All the intern research topics and their requirements are listed as follows.
- **Application deadline: March. 16, 2025**
- More detailed information about application can be found on the website https://sites.google.com/view/ccu-coe-internship/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

Project Number	P1
Project title	Optimal Transport and Information Geometry: Applications in Artificial Intelligence and Big Data Analytics
Description of the research	This project aims to explore the intersection of optimal transport theory and information geometry, focusing on their practical applications in artificial intelligence (AI) and big data analytics. Optimal transport offers a robust mathematical framework for modeling probability measures, providing insights into areas such as entropy-regularized transport, divergence functions, and Wasserstein metrics. These concepts have wide-ranging applications, including enhancing data processing algorithms, improving machine learning model accuracy, and optimizing large-scale data analytics tasks. The research will delve into topics such as the Monge-Kantorovich formulation, entropy-regularization techniques, and the interaction between Wasserstein geometry and information geometry. By applying these theoretical principles to AI models, the project aims to develop advanced computational methods that can handle complex, high-dimensional datasets more effectively. Potential outcomes include new algorithms for more efficient data transport and novel AI techniques that leverage the intrinsic geometric properties of data. This internship is suitable for interns with a strong background in mathematics, probability theory, and an interest in the theoretical aspects of AI and data science. Participants will gain hands-on experience in applying cutting-edge mathematical concepts to address real-world problems in AI and big data.
Mentor in CCU	Asst. Prof. Tsung-Wei Chiang Department of Computer Science and Information Engineering, National Chung Cheng University, Taiwan. (e-mail: twchiang@cs.ccu.edu.tw) (website: https://sites.google.com/view/twchiang)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Self-supported (entirely by interns themselves)

Project Number	P1
Intern period	At least 8 weeks between Jun. 1 and Dec. 31 , 2025
Remark	In principle, the number of interns accepted by this laboratory is not limited. However, each applicant may undergo an online interview as part of the selection process. Based on the duration of each intern's or trainee's stay, a first-come, first-served principle will be applied. Once the laboratory's seating capacity is full, no further interns will be accepted. National Chung Cheng University (CCU) and the laboratory principal investigator reserve the right for final approval of internship eligibility. Interns may be required to sign an internship agreement before the commencement of their internship to comply with relevant regulations. During the internship period, interns must adhere to the regulations and instructions of the hosting laboratory or CCU. Failure to comply with these regulations and instructions will result in the immediate termination of their internship eligibility, with arrangements made for their immediate return.

Project Number	P2
Project title	Trustable Artificial Intelligence for Critical Applications and 6G Security in Quantum Era
Description of the research	Artificial Intelligence (AI) technologies (Vision Transformer, ChatGPT, LLM), 6G networking, and quantum computing are the leading forces in bringing the world to the era of better intelligence and full automation. However, the rapid development of such technologies raises concerns that they could be used to damage human life, destroy critical infrastructure, and further violate user privacy. For example, AI power can be exploited to scan the vulnerabilities of critical control systems (SCADA, ITS) or track a target user in a restricted access building, even without physical intrusion. Similarly, the attackers can launch adversarial attacks against AI-based Advanced Driver-Assistance Systems (ADAS) and force connected vehicles to act as unexpected weapons to hit civilians. Early detection of security attacks and secure AI models are the top targets of many current research efforts. In short, this project encourages the talents who are interested in the following topics: **1)** **AI for Cybersecurity**: Misbehavior detection in autonomous vehicles, Deep Reinforcement Learning for aerial-assisted networks (UAV-satellite-space) or Intelligent Transportation Systems, Self-supervised Learning, autoDL /ML for Intrusion Detection Systems. **2)** **Cybersecurity for AI**: Trustable AI for automated vehicles and AI-based control systems from adversarial attacks. **3)** **6G security**: Signal sensing, physical layer authentication, high-accuracy localization and sensing. **4)** **Space and Quantum security**: Blockchain for vehicular/aerial networks; Quantum compatible IDS platforms. **5)** **Trustable AI for critical applications:** Vision Transformer, ChatGPT, LLM for smart grid, smart health, intelligent transportation, smart manufacturing. About CISLab: CISLab has been the home of many international students. In 2023-2024, a total of 30 international students arrived CISLab to do internships. Students are diverse and come from many countries, e.g., India, Vietnam, Thailand, Malaysia, Germany, Indonesia, Ethiopia, Iran, and India. Several interns have successfully submitted their research at our lab to the prestigious conferences/journals.

Project Number	P2
Description of the research	• Lab WEBSITE: https://ccucyberseclab.github.io • Lab member and photos: • https://sites.google.com/view/nvlinh/research-group • The details of past interns' activity: https://sites.google.com/view/teepcislab **What could you get during the internship period?** 1. The skill to obtain state-of-the-art research on selected topics, e.g., Explainable AI, WiFi sensing 2. Good programming skills through mini projects: e.g., AI models for preventing adversarial attacks 3. Create debate to gain novel or creative ideas to enhance assigned mini-projects 4. Report the results in a professional manner; for example, in LateX writing, IEEE Trans format 5. Attend several industry tours, Chinese courses, or research culture introductions. **Preferred Intern Education Level** • Third-year undergraduate students or above • Graduate candidates (had Bachelor/ Master) • Ph.D. students **Highly recommend the following candidates to join the lab:** 1. Strong interest in computer science, computer networks, AI, and cybersecurity. 2. Background knowledge in networking/security, mathematics, optimization, quantum, and computer vision. 3. Publications in my research field 4. International English proficiency certificate (TOEIC >=760, IELTS >=5.5, TOEFL iBT >= 80)
Mentor in CCU	Asst. Prof. Van-Linh Nguyen Dept. of Computer Science and Information Engineering National Chung Cheng University, Taiwan. (e-mail: nvlinh@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 12 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P3
Project title	Computer vision and generative AI for smart manufacturing and autonomous driving
Description of the research	Artificial Intelligence is now reaching many applications in our society's life. Many AI-based applications, such as ChatGPT, can provide great answers to many difficult questions beyond average human capability. However, AI has not yet performed well in what humans can do easily, e.g., help robots move smoothly, and drive the car in complex environments. Further, AI requires very large training and extensive computing resources, which not every lab can do. This project aims to propose usable AI and tiny AI to solve our common problems that make AI more reachable and affordable. This topic can cover the following issues: **1)** **Usable AI**: Skeleton authentication, facial authentication, object segmentation for automated vehicles, multimodal fusion AI for autonomous driving, Vision transformers for defect detections. **2)** **Tiny AI**: Lightweight AI for IoT devices and microcontrollers in smart manufacturing. **3)** **Quantum AI:** Quantum machine learning, Quantum vision transformer, quantum adversarial attacks. **About CISLab**: CISLab has been the home of many international students. In 2023-2024, a total of 30 international students arrived CISLab to do internships. Students are diverse and come from many countries, e.g., India, Vietnam, Thailand, Malaysia, Germany, Indonesia, Ethiopia, Iran, and India. Several interns have successfully submitted their research at our lab to the prestigious conferences/journals. • Lab WEBSITE: https://ccucyberseclab.github.io • Lab member and photos: https://sites.google.com/view/nvlinh/research-group • The details of past interns' activity: https://sites.google.com/view/teepcislab Preferred BS/MSc/PhD students with background on computer vision and software engineering.

Project Number	P3
Mentor in CCU	Asst. Prof. Van-Linh Nguyen Dept. of Computer Science and Information Engineering National Chung Cheng University, Taiwan. (e-mail: nvlinh@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 12 weeks between Jun. 1 and Dec. 31

Project Number	P4
Project title	Power Quality Study of Using Artificial Intelligence-based Approaches to Assess Harmonics Produced by Multiple Solar PV and Wind Turbine Generators
Description of the research	With the growing integration of renewable energy sources, solar photovoltaic (PV) and wind turbine systems are increasingly utilized in modern power grids. These systems introduce significant harmonics when connected to the grid, which impacts power quality. Thus, studying the harmonics produced by multiple solar PV and wind turbine generators is essential. Leveraging artificial intelligence (AI)-based approaches to assess these harmonics represents a promising research direction in the field of power quality. This study includes three aspects. 1. Harmonic Modeling and Detection: Traditional harmonic analysis methods, such as Fourier Transform, can provide insights into frequency components but are often insufficient when dealing with nonlinear and multi-source harmonics. AI, with its ability to process large datasets and self-learn patterns, offers improved accuracy and efficiency in detecting complex harmonic patterns. 2. Harmonic Prediction and Classification: AI can be used to predict harmonics in real-time. AI algorithms can classify harmonic sources by distinguishing between different devices, such as PV systems and wind turbines, based on their unique harmonic signatures. 3. Harmonic Mitigation and Optimization: AI can also aid in designing harmonic filters and optimizing strategies to minimize the impact of harmonics on the power grid.
Mentor in CCU	Prof. Gary Chang, PhD, PE, IEEE Fellow Dept. of Electrical Engineering, National Chung Cheng University, Taiwan. (e-mail: ieegwc@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student (higher priority will go to undergraduate students if more than two applicants)
Category	■ Scholarship ■ Self-supported
Intern period	At least 10 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P5
Project title	A Study of Grid Forming Inverter-based Resources for Low-Inertia Microgrid
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 grids 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 microgrid resilience and stability when the grid is subjected to severe disturbances.
Mentor in CCU	Prof. Gary Chang, PhD, PE, IEEE Fellow Dept. of Electrical Engineering, National Chung Cheng University, Taiwan. (e-mail: ieegwc@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student (higher priority will go to undergraduate students if more than two applicants)
Category	■ Scholarship ■ Self-supported
Intern period	At least 9 weeks between Jun. 1 and Dec 31, 2025

Project Number	P6
Project title	Computer vision applications based on deep learning techniques
Description of the research	This project 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, (2) fine-grained skeleton-based action recognition or diseases diagnosis (e.g., dementia, Parkinson), (3) action prediction for elderly monitoring, (4) object (head/vehicle/ human/ object) pose estimation from a single RGB image, (5) 3D human mesh model reconstruction from a single image, (6) Motion skeleton synthesis, (7) robotic grasp pose estimation from 3D point cloud data, (8) AI-generated content (AIGC), such as (text/audio/image)-to-(image/video) generation, (9) elderly caring application of AIGC, (10) heart rate estimation from facial image sequence. 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. For more detail about my topics, please visit my Youtube video at: https://youtu.be/tIwenpyFRhw
Mentor in CCU	Prof. Wen-Nung Lie Dept. of Electrical Engineering, National Chung Cheng University, Taiwan. (e-mail: ieewnl@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship
Intern period	At least 8 weeks (2 months) between Jun. 1 and Dec. 31, 2025. However, 3-6 months is preferred.

Project Number	P7
Project title	Impulse Radar Imaging System, mmWave/RF Intergrated Circuit design and Energy Harvesting
Description of the research	Four investigation topics over Ultra-Wideband Impulse Radar imaging system: 1. A back-projection imaging algorithm used to reconstruct the radar image. 2. The studies of the transmitting and receiving circuits and Vivaldi antenna array. 3. mmWave/RF integrated circuit design such as PA and LNA, by CMOS process or III-V technology. Energy harvesting within wireless communications environment
Mentor in CCU	Assoc. Prof. Janne-Wha Wu Dept. of, Electrical Engineering National Chung Cheng University, Taiwan. (e-mail: jwwu@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 10 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P8
Project title	Renewable Energy Integration: Modern Power System Analyses, State Estimation, Power Conversion Technologies, Intelligent Control for Renewable Energy Resources, Fault Diagnosis, Forecasting Technologies for Renewable Power Generation
Description of the research	The students will learn the research topics about renewable energy integration, which includes one of the following issues: ➢ Wind farm modeling and control ➢ Fault diagnosis for solar power systems ➢ Artificial intelligence applications on renewable power systems, including forecasting and fault diagnosis ➢ Power system protection ➢ Control technologies for voltage source converter, including grid forming and grid following technologies ➢ Inertia estimation and supporting ➢ Smart grid control and operation ➢ New state estimation technologies ➢ Frequency and voltage control by renewable power generation resources ➢ Energy storage systems ➢ Power system reliability and resiliency The detailed information for the Renewable Energy and Power System Lab led by Prof. Wu https://repsly.ccu.edu.tw/?Lang=en Google Scholar https://scholar.google.com/citations?hl=en&user=oypSKlMAAAAJ&view_op=list_works&sortby=pubdate Scopus https://www.scopus.com/authid/detail.uri?authorId=22954666100 Web of Science https://www.webofscience.com/wos/author/record/1866589
Mentor in CCU	Distinguished Prof. Yuan-Kang Wu Dept. of Electrical Engineering National Chung Cheng University, Taiwan. (e-mail: allenwu@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student Warm welcome if you would like study master or PhD degree in our Lab
Category	■ Scholarship
Intern period	At least 15 weeks between Jun.1 and Dec. 31, 2025

Project Number	P9
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. (e-mail: imegec@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship
Intern period	At least 9 weeks (up to 6 months) between Jun. 1 and Dec. 31, 2025

Project Number	P10
Project title	Development of electrodes for anion exchange membrane water electrolysis
Description of the research	Hydrogen production using renewable energy is important in moving forward to 2050 net zero emissions. The anion exchange membrane water electrolysis using non-noble metallic catalysts, reducing the cost of producing hydrogen. The efficiency depends on the reaction kinetics of both anode and cathode electrodes. Students in this project will learn the development of electrode and operation of water electrolysis.
Mentor in CCU	Prof. Yong-Song Chen Dept. of Mechanical Engineering National Chung Cheng University, Taiwan. (e-mail: imeysc@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship
Intern period	At least 9 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P11
Project title	Measurements of densities of gas-phase or liquid-phase reactive species generated by atmospheric pressure plasmas
Description of the research	Atmospheric-pressure plasmas have been developed extensively for applications such as plasma medicine and plasma agriculture due to the generation of abundant reactive species being critical for manipulating reaction pathways in different fields. Therefore, it is essential to characterize the densities of reactive species introduced by plasmas in the gas or liquid phase for various applications. In this project, the densities of O3/OH/NO2-/NO3- and metastable helium atoms will be explored by using the absorption spectroscopy and microplate reader spectrophotometer under different operating conditions to reveal the correlations among reactive species generated in the gas or liquid phase in different discharge parameters. Anyone interested in plasma technologies and characterization is welcome to join the project.
Mentor in CCU	Assoc. Prof. Kun-Mo Lin Dept. of, Mechanical Engineering National Chung Cheng University, Taiwan. (e-mail: imekml@ccu.edu.tw; kmlin.tw@gmail.com)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 9 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P12
Project title	Numerical modeling and Experiments of an atmospheric pressure plasma reactor
Description of the research	Atmospheric-pressure plasmas have been developed extensively for applications such as plasma medicine and plasma agriculture due to the generation of abundant reactive species being critical for manipulating reaction pathways in different fields. However, it is still challenging to develop a proper plasma source with controlled parameters by experimental measurements because of fast discharge dynamics and complex plasma chemistry. Alternatively, numerical simulations can be used to capture discharge dynamics with detailed chemistry revealed. In this project, a two-dimensional plasma fluid model will be integrated with a two-dimensional gas flow model to predict the dynamic behavior of an atmospheric pressure plasmas. The simulated results will be compared with experiments to validate the model. It is a topic involving physics, chemistry, and thermofluid science, which is suitable for students in mechanical engineering.
Mentor in CCU	Assoc. Prof. Kun-Mo Lin Dept. of, Mechanical Engineering National Chung Cheng University, Taiwan. (e-mail: imekml@ccu.edu.tw; kmlin.tw@gmail.com)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 9 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P13
Project title	Design of computer-aided diagnosis combined with Hyperspectral Imaging for bio-medical applications
Description of the research	Most of the computer-aided diagnosis (CAD) models developed in the recent years use only RGB images which has only three different color bands. One of the advanced non-invasive techniques used in clinical research is hyperspectral imaging (HSI), which captures data across hundreds of narrow, contiguous bands, each representing a distinct portion of the electromagnetic spectrum. This allows for detailed analysis of tissue characteristics, making HSI a powerful tool in medical diagnostics. This project will utilize various machine learning models, including YOLOv5, YOLOv8, R-CNN, Faster R-CNN etc, to detect and CNN, SVM and Random forest etc for multiple biomedical applications. It will make use of two models of the white-light images (WLI) model and the hyperspectral narrowband images (HSI-NBI) model. These models will be generated through a conversion algorithm referred to as the spectrum-aided vision enhancer (SAVE). The main goal will be to discover early stage bio-markers for effective prognosis. The evaluation of model performance will be conducted using the created confusion matrix and five important indicators: precision, recall, F1-score, mAP, and the confusion matrix of the trained model.
Mentor in CCU	Prof. Hsiang-Chen Wang Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan. (e-mail: hcwang@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship
Intern period	At least 12 weeks between 12 weeks and 25 weeks

Project Number	P15
Project title	Smart Sensing Technology for Smart Manufacturing
Description of the research	Welcome to the AISC Lab at CCU, where our research focuses on advancing smart manufacturing technology by utilizing sensor signals and integrating machine learning methods. Our lab combines physical kinematic research with cutting-edge algorithm development to drive innovation in the manufacturing sector. We are particularly focused on two key areas: 1. The Development of Smart Tool Holders: Our lab has developed smart tool holders designed to monitor and sense cutting dynamics accurately. This allows us to gain deeper insights into the machining process, improving precision and enhancing overall production quality. 2. Signal Processing and Smart Manufacturing: With the rise of Artificial Intelligence (AI) in manufacturing, we see a unique opportunity to integrate AI into smart manufacturing processes. However, the success of AI relies heavily on the accuracy of sensor signals, which are critical for creating reliable models. Our research aims to bridge this gap by combining signal processing techniques with AI to optimize and enhance modern manufacturing systems. We welcome students who are passionate about these topics and eager to contribute to the future of smart manufacturing technology.
Mentor in CCU	Prof. Her-Terng Yau Dept. of, Mechanical Engineering National Chung Cheng University, Taiwan. (e-mail: htyau@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 9 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P17
Project title	Implementing evaluation scenarios in B5G/6G communication of IMT-2030
Description of the research	This project focuses on building topologies and deriving environmental channel conditions for key scenarios that address the advanced challenges of B5G/6G within the IMT-2030 framework. These scenarios encompass hybrid networks integrating disparate technologies, including fixed, mobile cellular, high-altitude platforms, satellites, and others yet to be defined. A critical aspect of this project is exploring the role of AI-enabled wireless technologies in optimizing network operations, resource allocation, and system performance across these diverse networks. The integration of AI with wireless communication is expected to enhance the adaptability, efficiency, and intelligence of B5G/6G systems, enabling them to meet the demands of increasingly complex scenarios. By leveraging AI, this project aims to model and optimize communication environments dynamically, providing robust solutions for real-world applications. The outcome of this project will serve as a foundation for the realization, visualization, demonstration, evaluation, and calibration of future B5G/6G communication systems within IMT-2030. For further information, please visit our lab's website 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. (e-mail: jypan@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 9 weeks between Jun. 1 and Dec. 31, 2025

Project Number	P18
Project title	Study of Metal 3D Printing
Description of the research	Metal Additive Manufacturing, also known as metal 3D printing, offers the possibility to produce complex metal parts without many of the constraints of traditional manufacturing processes, such as machining, injection molding, and casting. Additive Manufacturing technology offers many advantages over more traditional manufacturing technologies, such as more complex designs, lighter weight, and better performance. There are seven different types of AM technologies identified in the ISO/ASTM standard. Among these AM technologies, recently, there are four types of them gradually used in the industry. 1. Powder Bed Fusion (PBF) – where a thermal source is used to selectively consolidate powdered materials. 2. Binder Jetting (BJT) – where liquid binder is selectively deposited to bind powdered materials. 3. Directed Energy Deposition (DED) – where feedstock material, either powder or wire, is melted via a focused thermal source as it is deposited 4. 4. Material Extrusion (MEX) – where material is extruded through a nozzle or orifice Our lab is recruiting talents who are interested in the following topics: 1) Process Analysis of Metal 3D Printing: The primary objective of this project is to perform a comprehensive parametric study of the Directed Energy Deposition (DED) process for stainless steel. This will involve an in-depth examination of various scanning parameters and their effects on the quality of printed lines, surfaces, and bodies. 2) Failure Analysis of Metal 3D Printing: The primary objective of this project is to conduct a series of mechanical tests on stainless steel samples fabricated using the Material Extrusion (MEX) process. The study will meticulously examine material properties, metallurgical micrographs, and SEM images to comprehend the failure mechanisms of metal 3D printed materials.

Project Number	P18
Description of the research	About Structural Fatigue & Fatigue (SFF) Lab: SFF Lab is a leading research group in the advanced metal 3D printing and welding technologies in National Chung Cheng University, established by Prof. Pai-Chen Lin. SFF Lab has been the home of many international intern students. Students are diverse and come from many countries, e.g., Vietnam, Thailand, Malaysia, and India. Our research interests consist of Additive Manufacturing (AM), Laser Welding (LW), Ultrasonic Welding (UW), and Friction Stir Welding (FSW). Lab WEBSITE: https://sites.google.com/view/ccu-me-structural-fatigue-lab/home
Mentor in CCU	Prof. Pai-Chen Lin Dept. of Mechanical Engineering National Chung Cheng University, Taiwan. (e-mail: imepcl@ccu.edu.tw)
Expected student level	■ Post-graduate student ■ Third/forth-year undergraduate senior student
Category	■ Scholarship ■ Self-supported
Intern period	At least 10 weeks (2 months) between June and December 2025