

2nd Call for 2019 Summer Internship

College of Engineering, National Chung Cheng University
(CCU), Taiwan

1. **Goal:** In Dec . 2018, we have accepted dozens of students from overseas countries for 2019 summer intern. However, according to several requests, we conduct a **2nd call** to enhance the collaborations between CCU and partner universities.
2. **Plan:** CoE of CCU would provide opportunities of summer intern for students for **at least 7 weeks** during May 1 to Aug 31 (for other months, please indicate in the application). Applicants should read the requirements of each research topic carefully, finish the online application form, prepare related documents (such as transcript, research plan, certificate of language proficiency, recommendation letter, etc.), and send the ZIP-compressed file (containing PDF files) to our DIA (Division of International Affairs) in the following e-mail address:

coleng_dia@ccu.edu.tw

The title of the e-mail please be marked with “Application of 2019 CCU summer intern”. All the intern research topics and their requirements are listed below. The online application form is at <https://goo.gl/forms/nsScS63IqEkgIHls1>

3. **Requirement:** The applicants should be graduate or at-least grade-3 undergraduate students.
4. **Intern period:** The summer break for CCU is from middle June to middle Sept. However, this 2nd call will focus on intern period starting from **May 1 at earliest and end on Aug. 31 at latest**. Since some universities in a certain countries have different break time, we also allow intern period in other months. Please indicate the period clearly in the application.
5. **Expense:** This 2nd call only recruits students who are willing to be self-supported. The estimated expenses, in addition to the flight fare (depending on your countries and flight schedules), in CCU include: (1) weekly expense (about NTD1,500 per week), round-trip transportation between CCU and airport (about NTD2,000 by high speed rail), and on-campus accommodations (about NTD1500~2000/month). Each applicant can have at most 6 priorities about the preferred research topics.
6. **Review:** The review of application is based on the following criteria: (1) GPA, (2) prior technical experience, (3) future research plan, and (4) language proficiency.
7. **Important dates:** The hard deadline for application is **March 3, 2019**. The review result will be announced by **March 11, 2019** and notification of acceptance/declination will be sent to each applicant individually.

Intern Research Topics

| Number | P1 |
|--|---|
| Project title : | Platform development of genome-scale metabolic network models and its optimal drug discovery |
| Description of the research (within 300 words) | This project is developed an algorithm of computational intelligence to infer oncogenes and to discover drug targets for various tissue specific cells, such as glial cell, pancreatic cell, urothelial cell, etc. In this inter, you will learn how to reconstruct a genome-scale metabolic model for each tissue specific cell and use our developed programs to infer oncogenes and to discover drug targets. You will also learn how to use biological databases converting the computational data to be biological meaningful results. |
| Mentor in CCU | Prof. Feng-Sheng Wang Dept. of Chemical Engineering, National Chung Cheng University, Taiwan. (chmfsw@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/ forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 3 months |

| Number | P2 |
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| Project title : | Study on the over-expression and production of proteins using recombinant Escherichia coli |
| Description of the research (within 300 words) | This research is to discover the high-cell-density cultivation of recombinant cells and mechanism of inclusion bodies formation in Escherichia coli over-expressing recombinant proteins. Therapeutic proteins and enzymatic proteins for biochemical production will selected as the targets. In this summer intern, you will learn how to construct the vectors for the over-expression of these proteins. |
| Mentor in CCU | Prof. Wen-Chien Lee Dept. of Chemical Engineering, National Chung Cheng University, Taiwan, ROC. (chmwcl@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/ forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P3 |
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| Project title : | Artificial-Intelligence Impulse Radar Signal Analysis |
| Description of the research (within 300 words) | This research is focused on ground penetrating system by impulse radar system with deep learning algorithm. It not only handles with hardware, but also integrates with the knowledge of signal analysis. The students who are familiar one of the skills such as matlab programming or instrument data extraction tool are preferred. |
| Mentor in CCU | Associate Prof. Janne-Wha Wu Dept. of Communications Engineering, National Chung Cheng University, Taiwan, ROC. (jwwu@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P4 |
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| Project title : | Small Object Detection |
| Description of the research (within 300 words) | <p>This research is to explore the deep learning method to detect the small object in the image. The small object detection is important for several applications such as remote object avoidance of ADAS systems; which can help to avoid the obstacle from the long distance; or small object detection in the aerial image, which is used for the surveillance purpose. In this summer intern, you will learn:</p> <ul style="list-style-type: none"> - How to read a research paper, organize the main idea, and prepare the presentation. - How to implement your ideas in the programming language. - How to cooperate in the teamwork. - Advanced techniques in Image Processing, Computer Vision and Machine Learning. |
| Mentor in CCU | Prof. Ching-Chun Huang Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (chingchun.huang6@gmail.com) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P5 |
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| Project title : | Content-aware 360 degree video coding |
| Description of the research (within 300 words) | This research is about the 360 degree video coding system. Capturing the scene and representing it with efficient panoramic images will be first addressed. Then a saliency video is generated and served as a guidance for efficient 360 degree video coding to offer high quality video. In this summer internship, the intern not only learn C/C++ programs to implement the proposed techniques, related deep learning platform is also accessed. |
| Mentor in CCU | Prof. Jui-Chiu Chiang Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (rachel@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 8 weeks |

| Number | P6 |
|--|---|
| Project title : | The structure design of modern generators and motors |
| Description of the research (within 300 words) | This research is to design the structure of modern generators and motors using Finite Element Method (FEM) and electromagnetic method. The candidates need some background and experience for FEM or motor design. Additionally, the candidates must have good capability on English reading and writing. |
| Mentor in CCU | Prof. Yuan-Kang Wu Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (allenwu@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 8 weeks |

| Number | P7 |
|--|---|
| Project title : | Renewable Energy Forecasting |
| Description of the research (within 300 words) | This research is to forecast renewable power generation. The candidates need some backgrounds on time series, statistics, AI technique and Matlab programming. Additionally, the candidates must have good capability on English reading and writing. |
| Mentor in CCU | Prof. Yuan-Kang Wu Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (allenwu@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 8 weeks |

| Number | P8 |
|--|--|
| Project title : | Machine Learning for VLSI Design Automation |
| Description of the research (within 300 words) | The project is to explore modern machine techniques for Electronic Design Automation (EDA), specifically for VLSI chip design. The candidates will study and present recent published papers in the EDA field, proposed new methods to solve existing or new VLSI design problems, and implement the methods with C/C++ or Python programming languages. |
| Mentor in CCU | Prof. Mark Po-Hung Lin Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (marklin@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | About 3 months |

| Number | P9 |
|--|---|
| Project title : | Video-based augmented reality (AR) system for gaming |
| Description of the research (within 300 words) | This research is to explore the design of a video-based AR/VR system for young people's gaming. In this system, a camera, a display, and a computing device (PC or notebook computer) are used to achieve the |

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| | purpose. The young guy stand on a ground without anything. However, they can see a virtual carpet around their feet on the display so that they can walk, jump, or dance on the carpet in a pattern instructed by the computer tutor. This activity is interesting and helpful to exercise. This system will never require a physical carpet, thus significantly saving the system cost and space requirement. You are requested to design the image/video processing techniques so that an AR system is achieved. Skills in C/C++ programming are required. |
| Mentor in CCU | Prof. Wen-Nung Lie Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (ieewnl@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input checked="" type="checkbox"/> Third/forth-year undergraduate senior student <input type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P10 |
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| Project title : | Not available |
| Description of the research (within 300 words) | Not available |
| Mentor in CCU | Prof. Wen-Nung Lie Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (ieewnl@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | Not available |

| Number | P11 |
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| Project title : | Design of intelligent vision system for eye-in-hand robot arms |
| Description of the research (within 300 words) | This research is to design an intelligent vision system for robot arms. The camera is installed on the robot arm, so called eye-in-hand. You can design an image processing system to drive the robot arm to see, recognize, pick, and place the objects from anywhere to everywhere. This vision system will be a key technology for Industry 4.0. In this summer intern, you will learn how to write C/C++ programs for image processing/pattern recognition, and learn how to |

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| | control the robot arm. Hopefully, you can learn how to use deep learning techniques for object recognition. |
| Mentor in CCU | Prof. Wen-Nung Lie Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (ieewnl@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P12 |
|---|--|
| Project title : | Influence of Lubrication, Preloading and Thermal Expansion for Ball Screw |
| Description of the research (within 3000 words) | Research Field |
| | Tribology, Nanomechanics, Nanotechnology, Surface Texture, Characterization, Fabrication and Performance, |
| | Research Description |
| | The student participating in this project will analyze the relationship among lubrication, preloading and thermal expansion of the ball screw moving system. Our research team has built two ball screw test system to simulate and monitor the ball screw moving behavior, lubrication condition, temperature rise, friction force, wear condition, preloading force etc. Over the course of the project, the student will acquire a detailed knowledge of ball screw principle and relationship between lubrication, friction force and temperature rise. Besides ball screw study, our other research projects involve high speed ball bearing and lubrication system, contact mechanics of rough surfaces in tribology, deposition of diamond-like carbon coatings, nanomechanics, biomedical materials mechanics and chemical mechanical polishing/planarization. |
| Mentor in CCU | Prof. Yeau-Ren Jeng Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (imeyrj@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P13 |
|--|--|
| Project title : | Thermal analysis of an atmospheric-pressure helium dielectric barrier discharge reactor |
| Description of the research (within 300 words) | Atmospheric-pressure helium dielectric barrier discharges are essential plasma sources for medical applications such as wound healing and cancer treatment. This project will conduct measurements of reactor temperature and rotational temperature of the discharge by the infrared thermometer and the spectrometer, respectively. The mechanisms of gas heating will be explored by numerical simulations using plasma fluid model solving species continuity equations and gas flow model considering conjugate heat transfer within the reactor. The simulated temperature will be compared with the measured reactor temperature to validate the model. You will learn how to conduct the thermal analysis including measurements/simulations and the fundamental basics of plasma reactor. |
| Mentor in CCU | Assistant Prof. Kun-Mo Lin Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (imekml@ccu.edu.tw/kmlin.tw@gmail.com) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P14 |
|--|--|
| Project title : | Characterization of ozone in atmospheric-pressure helium dielectric-barrier discharges |
| Description of the research (within 300 words) | Atmospheric-pressure helium dielectric barrier discharges are essential plasma sources for medical applications such as wound healing and cancer treatment. This project will measure ozone densities in the reactor under various operating conditions by using ultraviolet absorption spectroscopy (UVAS). The mechanisms of ozone generation will be explored by numerical simulations using plasma fluid model solving species continuity equations, electron energy density equation, and the Poisson equation. The simulated results will be validated by measurements. You will learn how to conduct the optical measurements for determining ozone densities and the fundamental basics of plasma reactor. |
| Mentor in CCU | Assistant Prof. Kun-Mo Lin |

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| | Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (imekml@ccu.edu.tw/kmlin.tw@gmail.com) |
| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 7 weeks |

| Number | P15 |
|--|---|
| Project title : | Friction Stir Welding and Friction Stir Additive Manufacturing (FSAM) Process |
| Description of the research (within 300 words) | This work focuses on a development of a solid state welding and additive manufacturing technique by applying the friction stir welding to 3D solid state friction stir additive manufacturing (FSAM) to attain microstructure refinement and structural integrity and efficiency. The scope of this work for the summer interns includes equipment modification, innovative jig & fixture design, new tool design for lap stir joint of stacked layers of sheet metal combination, setup of parameter-windows, microstructure study and materials test. |
| Mentor in CCU | Prof. Jong-Ning Aoh Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. (imejna@ccu.edu.tw) |
| Expected student level | <input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both Note that: students who will graduate in June/July, 2019 will not be accepted |
| Intern period | At least 7 weeks |

| Number | P16 |
|--|---|
| Project title : | Effect of operating conditions on the performance of an all-vanadium redox flow battery |
| Description of the research (within 300 words) | The performance of the VRFB is influenced by operating conditions, such as electrolyte concentration and electrolyte flow rate. Students will conduct experiments to investigate the effect of operating conditions on the performance of the VRFB and determine a suitable operating strategy. |
| Mentor in CCU | Prof. Yong-Song Chen Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. (imeysc@ccu.edu.tw) |

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| Expected student level | <input type="checkbox"/> Post-graduate student <input type="checkbox"/> Third/forth-year undergraduate senior student <input checked="" type="checkbox"/> Both |
| Intern period | At least 8 weeks |