Call for 2018 CCU Summer Internship (Graduate/Under-G)

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

1. **Goal**: the goal of this summer internship is to fulfill the collaborations between CoE/CCU and other overseas universities.
2. **Plan**: CoE of CCU would provide opportunities of summer intern for students for 6-8 weeks during March 1 to Aug. 31. 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 Mrs. Yvonne Wu (admuwu@ccu.edu.tw). The title of the e-mail please be marked with "Application of CCU summer intern". All the intern research topics and their requirements are listed below. The online application form is at https://goo.gl/forms/ZY9U4DabucVX8jlj2
3. **Requirement**: The applicants should be graduate or at-least grade-3 undergraduate students. **Students who will be graduated before July, 2018 will not be accepted**.
4. **Intern period**: The summer break for CCU is from middle June to middle Sept. However, considering the different summer break of the partner universities and the vacancy of student dormitory, the intern period will start from March 1 at earliest and end on Aug. 31 at latest.
5. **Scholarship**: research topics are offered in two types: (A) scholarship and (B) self-supported. Each applicant can have at most 5 priorities about the preferred research topics (A and/or B types). For type-A, the accepted applicant will be offered with a scholarship of maximum NTD$24,000 to cover the flight fare (maximum NTD10,000), living expense (NTD1,500 for one week; maximum NTD12,000), and transportation in Taiwan (maximum NTD2,000). Accepted applicants will also be offered with free on-campus accommodations (however, you should pay the fees of electricity and internet yourself). For type-B students, we will arrange on-campus accommodations for them and the fee is about NTD4000 for 2 months. For your reference, in 2017, we accepted 32 students (20 with scholarship and 12 are self-supported) from among 64 applicants.
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 deadline for application is **Dec. 27, 2017**. Note that this is a hard deadline since our schedule is very tight. Applications with missing documents

will be ignored without further review. The review result will be announced by **Jan. 10, 2018** and notification of acceptance/declination will be sent to each applicant individually.

Intern Research Topics

Number:P1	
Project title：	Estimation of front vehicle distance based on single camera for ADAS applications
Description of the research (within 300 words)	This research is to explore the image processing algorithm to estimate the distance of the front vehicle based on a single CCD camera which is installed near the rearview mirror of the car. This estimation is important for ACC (Adaptive Cruise Control) function in ADAS systems (Advanced Driver Assistance Systems). In this summer intern, you will learn how to write C/C++ programs and develop algorithms to achieve the above purpose.
Mentor in CCU	Prof. Wen-Nung Lie Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. ieewnl@ccu.edu.tw http://www.dsp.ee.ccu.edu.tw/wnlie.html
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in this June/July will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship
	■ B: Self-supported

Number:P2	
Project title：	Video-based augmented reality (AR) system for elder person's active aging
Description of the research (within 300 words)	This research is to explore the design of a video-based AR/VR system for elders. In this system, a camera, a display, and a computing device (PC or notebook computer) are used to achieve the purpose. The elders stand on a ground without anything. However, they can see a virtual carpet around their feet on the display so that they walk on the carpet in a pattern instructed by the computer tutor. This activity is proved to be helpful to active aging. 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 http://www.dsp.ee.ccu.edu.tw/wnlie.html
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in this June/July will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship
	■ B: Self-supported

Number:P3	
Research title	Fall event detection based on multi-view videos by using deep learning approach
Description of the research (within 500 words)	This research is to estimate human pose (in terms of a human's 3D skeleton model) from multi-view images and then to detect falling event. Our approach will be based on machine learning techniques such as CNN or RNN (deep learning). This technique is useful in video surveillance system used to monitor elder persons' daily life. The intern student is expected to have some preliminary knowledge on NN (neural network) or deep learning and skilled in C/C++ 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, ROC. ieewnl@ccu.edu.tw http://www.dsp.ee.ccu.edu.tw/wnlie.html
Expected student grade	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in this June/July will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship
	☐ B: Self-supported

Number: P4	
Project Title	Fundamental Researches of Power System Analyses, Power Plant Operation (including renewable energy), Energy Economics, or Electric Machine Design
Description of the research (within 300 words)	This research focuses on the fundamental study on power system analyses, power plant operation, energy economics or electric machine design. The intern students can choose any of the above-mentioned

	topics. In the power system analyses, students will implement various steady-state and transient analyses for power systems. In terms of the power plant operation, students will learn the unit commitment and scheduling for power plants (including renewable energy). For the energy economics, students will learn the issues about power markets and renewable energy economics. For the Electric Machine Design, students will learn the motor design by using Finite element method or magnetism methods. The students that apply the "Scholarship" category must prepare a paper based on the research results, and submit it to an international conference or journal in the end of intern research.
Mentor in CCU	Prof. Yuan-Kang Wu Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. allenwu@ccu.edu.tw https://sites.google.com./site/ccureslab/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both
Intern period	8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship ■ B: Self-supported

Number:P5	
Project title：	360 degree panoramic imaging
Description of the research (within 300 words)	This research is about the 360 degree free-view imaging system. Capturing the scene and representing it with efficient panoramic images will be first addressed. Then rendering a high quality free-view image using the selected panoramic data will be performed. In this summer internship, the intern will learn how to use C/C++ programs to implement the proposed techniques.
Mentor in CCU	Prof. Jui-Chiu Chiang Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. rachel@ccu.edu.tw http://www.dsp.ee.ccu.edu.tw/chiang.html
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship

	■ B: Self-supported

Number:P6	
Project title：	Indoor localization and target tracking based on multiple sensors
Description of the research (within 300 words)	This research is to utilize many sensors for indoor localization and target tracking. The target interns are required to learn signal processing and information fusion in order to design the tracking algorithm. Strong programming ability is necessary in order to realize the system
Mentor in CCU	Prof. Ching-Chun Hunag Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. chingchun@ccu.edu.tw http://acm.ee.ccu.edu.tw/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship
	■ B: Self-supported

Number:P7	
Project title：	Home Care Robot Design by Using Nao Robot and Choregraphe Developing Platform
Description of the research (within 300 words)	This internship project is about a practical design of home care robot. The developing platform is the popular robot Nao, which can be controlled via the programming of Choregraphe developing tool with Python. The students will discuss their design progresses and issues with project supervisor periodically and be encouraged to resolve problems by themselves as research students.
Mentor in CCU	Prof. Ying-Hao Yu Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. conanyu@ccu.edu.tw
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■A: Scholarship

	■ B: Self-supported

Number:P8	
Project title：	Friction Stir Additive Manufacturing (FSAM) Process
Description of the research (within 300 words)	This work focuses on a development of a solid state additive manufacturing technique by converting the friction stir processing (FSP) into a 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 hardness 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	□ First-year graduate student □ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between June 15 and Sept. 15
Category	■ A:Scholarship
	■B:Self-supported

Number:P9	
Project title：	Tribology/ Influences of Misalignment on the Preload Force of Ball Screws
Description of the research (within 300 words)	Tasks and responsibilities of the student: 1)Basic knowledge about ball screws. 2)Knowledge about the design of the machine and how machine tools work like. 3)Basic knowledge about measuring with strain gauges and setup the amplifier. 4)Evaluate measured data with MS Excel. 5)Analytical thinking
Mentor in CCU	Prof. Yeau-Ren Jeng Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. imeyrj@ccu.edu.tw http://140.123.122.205/tribology/
Expected student level	□ First-year graduate student

	☐ Third/forth-year undergraduate senior student ■ Both
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship
	■ B: Self-supported

Number:P10	
Project title：	Joining Process for Aluminum to Carbon Fiber Reinforced Plastic (CFRP)
Description of the research (within 300 words)	Carbon fiber reinforced plastic (CFRP) is widely used in the aerospace industry due to its excellent mechanical properties. Recently, BMW AG starts to use CFRP to make components in the car-body for the i-series electric cars and 7-series luxury cars. In order to adapt CFRP for production vehicles, a chip, efficient, and reliable joining technology is the key. This research is to try explore a joining process for aluminum to carbon fiber reinforced plastic sheets. Three advanced joining processes, ultrasonic welding, thermo-clinching, adhesive bonding, will be considered here. The mechanical properties of joints will be evaluated through tensile and fatigue tests.
Mentor in CCU	Associate Prof. Pai-Chen Lin Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. imepcl@ccu.edu.tw https://sites.google.com/view/ccu-me-structural-fatigue-lab
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship
	■ B: Self-supported

Number:P11	
Project title：	Development of direct borohydride/peroxide fuel cells (DBPFC)
Description of the research (within 300 words)	A direct borohydride/peroxide fuel cell operates with liquid fuel and oxidant, which reduces to challenges of hydrogen and oxygen storage. A DBPFC can be employed for the power source of unmanned under water vehicles. In this project, students will study the effect of operating parameters on the performance of a DBPFC, including catalyst loading, concentrations of anolyte and catholyte, current density, and flow rates

	of fuel and oxidant. Tasks and requirements: (1) Understanding basic principles of fuel cells. (2) Familiar with Matlab and Labview (3) Measuring performance under various operating conditions (4) Reviewing journal papers and writing experimental report
Mentor in CCU	Prof. Yong-Song Chen Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. imeysc@ccu.edu.tw https://sites.google.com/site/ccumefuelcell/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship ■ B: Self-supported

Number:P12	
Project title：	Deep Learning and Computer Vision Algorithm for Activity Recognition
Description of the research (within 300 words)	This research is to explore the computer vision algorithm and deep learning method to estimate human activity based on a single CCD camera which is installed in front of the cell phone, and the sensors by sport bracelets and T-shirt. This estimation is important for helping injured people or the elderly to recover their health. In this summer intern, you will learn how to train deep learning models by Caffe/Tensorflow and develop computer vision algorithms to achieve this purpose.
Mentor in CCU	Prof. Chen-Kuo Chiang Dept. of Computer Science and Information Engineering, National Chung Cheng University, Taiwan, ROC. ckchiang@cs.ccu.edu.tw http://mvllab.cs.ccu.edu.tw/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship

	■ B: Self-supported

Number:P13	
Project title：	Interactive Virtual Reality / 3D Modeling
Description of the research (within 300 words)	This research is to create interactive virtual reality environment based on HTC VIVE. In this summer intern, you will learn Unity programming to build the virtual reality environment and modeling tools to create 3D objects to make a complete scenery for a story to let users walk, explore, interact with objects in this world.
Mentor in CCU	Prof. Chen-Kuo Chiang Dept. of Computer Science and Information Engineering, National Chung Cheng University, Taiwan, ROC. ckchiang@cs.ccu.edu.tw http://mvllab.cs.ccu.edu.tw/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship
	■ B: Self-supported

Number:P14	
Project title：	Deep learning for image attribute analysis
Description of the research (within 300 words)	We will focus on study predicting or estimating various image attributes based on deep learning techniques. Motivated by the state-of-the-art image attribute research and the recent advance of deep learning techniques, we will design deep neural networks to estimate image attributes in different domains. For example, for outdoor images we would like to classify the weather type, temperature, humidity, or other weather properties. For movie poster images, we would like to do genre classification and metadata estimation. Many research potentials will be tried and investigated. In this summer intern, you will learn how to implement a deep learning system.
Mentor in CCU	Prof. Wei-Ta Chu Dept. of Computer Science and Information Engineering, National Chung Cheng University, Taiwan, ROC.

	wtchu@ccu.edu.tw http://mclab.cs.ccu.edu.tw/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both Note that: students who will graduate in June/July, 2018 will not be accepted
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	A: Scholarship
	■ B: Self-supported

Number:P15	
Project Title	Study on the over-expression of proteins in Escherichia coli
Description of the research (within 300 words)	This research is to discover the 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 http://www.che.ccu.edu.tw/~bio/
Expected student level	☐ First-year graduate student ☐ Third/forth-year undergraduate senior student ■ Both
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	■ A: Scholarship
	■ B: Self-supported

Number:P16	
Research title	Implementation of evaluation scenario in 5G communication of 3GPP
Description of the research (within 500 words)	This research is to build topologies and derive environmental channel conditions in several generally accepted scenarios which contain focused 5G challenges in the well-known 3GPP, such as very high data rate and very dense crowds. These scenarios include indoor offices, dense urban environment, and urban macro base stations. The outcome of this project can be used in realization, visualization, demonstration, evaluation, and calibration of future 5G communication systems in 3GPP.
Mentor in CCU	Prof. Jen-Yi Pan Dept. of Communications Engineering, National Chung Cheng University, Taiwan, ROC. (email: jypan@ccu.edu.tw)

	(http://www.ee.ccu.edu.tw/people/bio.php?PID=889&lang=en)
Expected student grade	☐ First-year graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	Any 6-8 weeks between March 1 and Aug. 31
Category	☐ A: Scholarship
	■ B: Self-supported