

Call for Summer Internship (Graduate/Under-G)

College of Engineering, National Chung Cheng University,
Taiwan

1. **Goal:** the goal of this summer internship is to fulfill the conclusion of discussions on collaborations between CoE of CCU and other overseas universities in March 2016.
2. **Plan:** CoE of CCU would provide opportunities of summer intern for students for 6-8 weeks during June 27 to Aug 27. Applicants should read the requirements of each research topic carefully, prepare related documents (such as application form, transcript, research plan, certificate of language proficiency, recommendation letter, etc.), and send the ZIP-compressed file (containing PDF files) to Ms 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.
3. **Intern period:** The summer break for CCU is from middle June to middle Sept. However, considering the vacancy of student dormitory and the time to applying for the intern visa, our intern will start from June 27 at earliest and end on Aug. 27 at latest.
4. **Scholarship:** Each accepted applicant will be offered with a scholarship of maximum NTD\$24,000 to cover the flight fare (maximum NTD10,000), monthly expense (maximum NTD12,000), and transportation in Taiwan (maximum NTD2,000). Some of the payment will be reduced proportionally if the stay of intern is less than 8 weeks (e.g., the payment for living expense is NTD1,500 per week). Accepted applicants will be offered with in-campus accommodations, whose fees will be covered by CoE herself.
5. **Review:** The review of application is based on the following criteria: (1) GPA, (2) the match between the prior experience and the future research plan of the applicant, and (3) language proficiency. Only one applicant will be accepted for each research topic.
6. **Important dates:** The deadline for application is **May 2**. 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 **May 10** and notification of acceptance/declination will be sent to each applicant individually.

Intern Research Topics

P1	
Research title	Pedestrian/bicycle detection from mono/binocular images for ADAS applications
Description of the research (within 500 words)	This research is to explore the computing algorithms to detect the pedestrians/bicycles that are dangerous to the driving via a single or stereo camera equipped near the review mirror or windshield of the car. The results can be applied to ADAS (Advanced Driver Assistance System) system for car safety. First of all, candidate areas of the pedestrian/bicycles are extracted from a single image. Disparities of sparse points near the candidates are then estimated via the left and right images of the stereo camera. The disparity can be easily converted to depth (or even the 3D coordinates) of the object provided that some parameters of the stereo camera are calibrated in advance. Knowing the 3D depth variations, pedestrian/bicycle that are harmful along the driving path can be determined. In this project, the focused kernel technology will be on pedestrian/bicycle detection via machine learning and disparity (depth) estimation from binocular images.
Mentor in CCU	Prof. Wen-Nung Lie (Chair) Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: ieewnl@ccu.edu.tw Website: http://www.dsp.ee.ccu.edu.tw/wnlie.html
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both (however, graduate student is preferable)
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P2	
Research title	Context-aware system for home care
Description of the research (within 500 words)	This work explores the machine learning to realize home care applications. Multiple signals from IP cameras, biosensors, environmental sensors and so on are captured, processed, and understood to build an intelligent context-aware system.
Mentor in CCU	Prof. Oscar T.-C. Chen Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: oscal@ee.ccu.edu.tw

	Website: http://www.dsp.ee.ccu.edu.tw/ochen/
Expected student grade	<input checked="" type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27th and Aug. 27th

P3	
Research title	Renewable Energy Integration and Power Quality Analysis
Description of the research (within 500 words)	This research is to develop the corresponding technologies on renewable energy integration and associated power quality analysis methods (flicker, harmonics, inter-harmonics and transients). Serious working attitude is a MUST for the applicant.
Mentor in CCU	Gary W. Chang, PhD, PE, Fellow IEEE Distinguished Professor Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: wchang@ee.ccu.edu.tw Website: http://140.123.111.49/teacher/english/wchang.htm
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate student (turning into senior) <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P4	
Research title	Renewable energy integration and corresponding control technologies
Description of the research (within 500 words)	This research is to study the renewable energy integration and corresponding control technologies. The detailed topics include power system analyses in the high penetration renewable energy system, control technologies of renewable energy, power system flexibility analyses and energy economics. The students who join this research must work hard.
Mentor in CCU	Associate Prof. Yuan-Kang Wu Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: allenwu@ccu.edu.tw Website: https://sites.google.com/site/ccureslab/

Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P5	
Research title	Implementation of evaluation scenario in 5G communication
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 challenges in the well-known 5G METIS project, such as very high data rate and very dense crowds. These scenarios include indoor offices, shopping malls, stadiums, and open air festivals. The outcome of this project can be used in realization, visualization, demonstration, evaluation, and calibration of future 5G communication systems.
Mentor in CCU	Associate Prof. Jen-Yi Pan Dept. of Communications Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: jypan@ccu.edu.tw Website: http://www.ee.ccu.edu.tw/people/bio.php?PID=889&lang=en
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P6	
Research title	Novel method of projector-camera calibration for 3D optical scanner
Description of the research (within 500 words)	System calibration, which usually involves complicated and time-consuming procedures, is crucial for any 3-D shape measurement system. For projector-camera system calibration, one popular approach is to treat the projector as an inverse camera. This is usually performed by projecting horizontal and vertical sequences of patterns to establish one-to-one mapping between camera points and projector points. The aim of this research is to enhance this popular approach, making it fast, robust, and accurate.
Mentor in CCU	Associate Prof. Chien-Sheng Liu Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: imecsl@ccu.edu.tw

	Website: http://deptime.ccu.edu.tw/deptime_new/professor/professor_eng_show.php
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P7	
Research title	Development on the aptamer-based microfluidic system for fast detection of circulating tumor cells utilizing electrical impedance sensing
Description of the research (within 500 words)	This topic is to develop the hardware and software systems and devices for rapid diagnosis of circulating tumor cells (CTCs). We will develop an aptamer-based technology of microfluidic sensor capable to fast detect circulating tumor cells in whole blood for cancer diagnosis. We will design microstructures in the microfluidic channel for mixing the whole blood sample with lysing buffer in the upstream region to lyse the blood cells. Then, cancer cells will be captured on the aptamer-modified surface via the dielectrophoretic effect in the downstream region while the electric field is applied. The interns will work on the development of impedance sensing techniques.
Mentor in CCU	Prof. Chun-Ping Jen Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: imecpj@ccu.edu.tw Website: http://deptime.ccu.edu.tw/deptime_new/professor/professor_eng_show.php
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27

P8	
Research title	Development on the aptamer-based microfluidic chips for dielectrophoretic capture of circulating tumor cells
Description of the research (within 500 words)	Aptamers are single-stranded DNA oligonucleotides, and they are more stable than the protein antibodies, due to the unique conformation have high selectivity to their targets while they are easy to modify with any labels and chemical groups. Due to the high selectivity and stability of aptamers, their use as an affinity sorbent for circulating tumor cells (CTCs) in microfluidic devices allows detecting circulating cells in a few ml of blood. Some unique properties of the aptamers make them more preferable in comparison with protein antibodies for CTCs sorption. In our project, we will develop an aptamer-based technology of microfluidic sensor capable to fast detect circulating tumor cells in whole blood for cancer diagnosis. We will design microstructures in the microfluidic channel for mixing the whole blood sample with lysing buffer in the upstream region to lyse the blood cells. Then, cancer cells will be captured on the aptamer-modified surface via the dielectrophoretic effect in the downstream region while the electric field is applied. The interns will focus on the chip design and finding aptamers for cancer identification.
Mentor in CCU	Prof. Chun-Ping Jen Dept. of Mechanical Engineering, National Chung Cheng University, Taiwan, ROC. E-mail: imecpj@ccu.edu.tw Website: http://deptime.ccu.edu.tw/deptime_new/professor/professor_eng_show.php
Expected student grade	<input type="checkbox"/> First-year graduate student <input type="checkbox"/> Third-year undergraduate junior student <input checked="" type="checkbox"/> Both
Intern period	Any 6-8 weeks between June 27 and Aug. 27