
Grand Challenge Scholars Program (全球工程領袖培育計劃)

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Grand Challenge Scholars Program (GCSP)

- To educate the future leaders of the National Academy of Engineering (NAE) Grand Challenges
 - Provide pragmatic solutions for basic human needs
 - Connect technology with society
 - Be the architects of a sustainable society
 - Reinvent human interactions
- In 2008, the NAE identified 14 Grand Challenges for Engineering in the 21st Century
 - The challenges address opportunities and challenges affecting quality of life



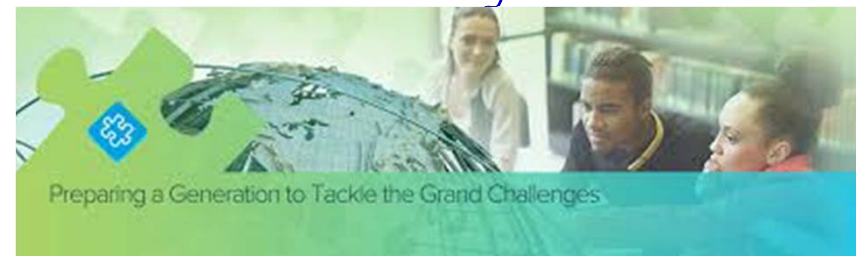
14 NAE Grand Challenges (1/2)

- Energy and Environment (Sustainability)
 - Make Solar Energy Economical
 - Provide Access to Clean Water
 - Provide Energy from Fusion
 - Manage the Nitrogen Cycle
 - Develop Carbon Sequestration Methods
- Health
 - Advance Health Informatics
 - Engineer Better Medicines



14 NAE Grand Challenges (2/2)

- Security and Society
 - Restore and Improve Urban Infrastructure
 - Prevent Nuclear Terror
 - Secure Cyberspace
- Joy of Life (Learning and Computation)
 - Advance Personalized Learning
 - Enhance Virtual Reality
 - Reverse-Engineer the Brain
 - Engineer the Tools for Scientific Discovery

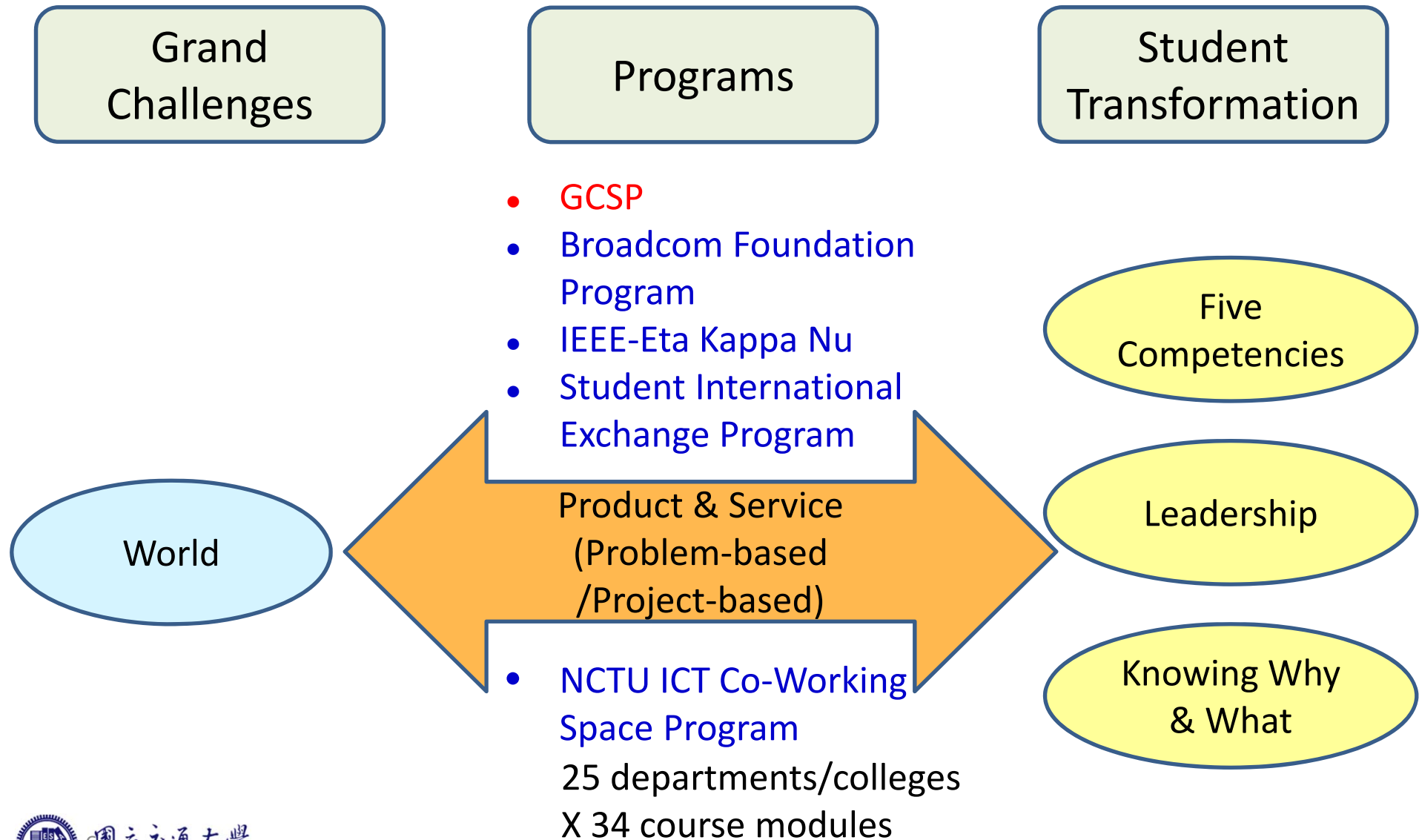


NAE GCSP Certification

- Each program includes curricular and extra-curricular activities designed to give students skills and experiences in five required areas:
 - Research related to a Grand Challenge
 - Interdisciplinary Component
 - Entrepreneurship
 - Global Dimension
 - Service Learning
- Institutions propose programs that are reviewed and approved by the NAE GCSP Steering Committee
 - Students who successfully complete program are recognized by NAE



NCTU Leadership and Grand Challenges Program Including Grand Challenges Scholars Program



全球工程領袖培育計劃 (1/4)

- 緣起及目標：
 - 本計劃是透過美國工程學院邀請本院加入 Grand Challenge Scholars Program (GCSP)
 - 在台灣區本校電機學院是第一個參與此計畫
 - 透過對於全球工程議題之關注與挑戰，讓本院學生能夠與國際接軌，成為具國際視野之工程領袖菁英



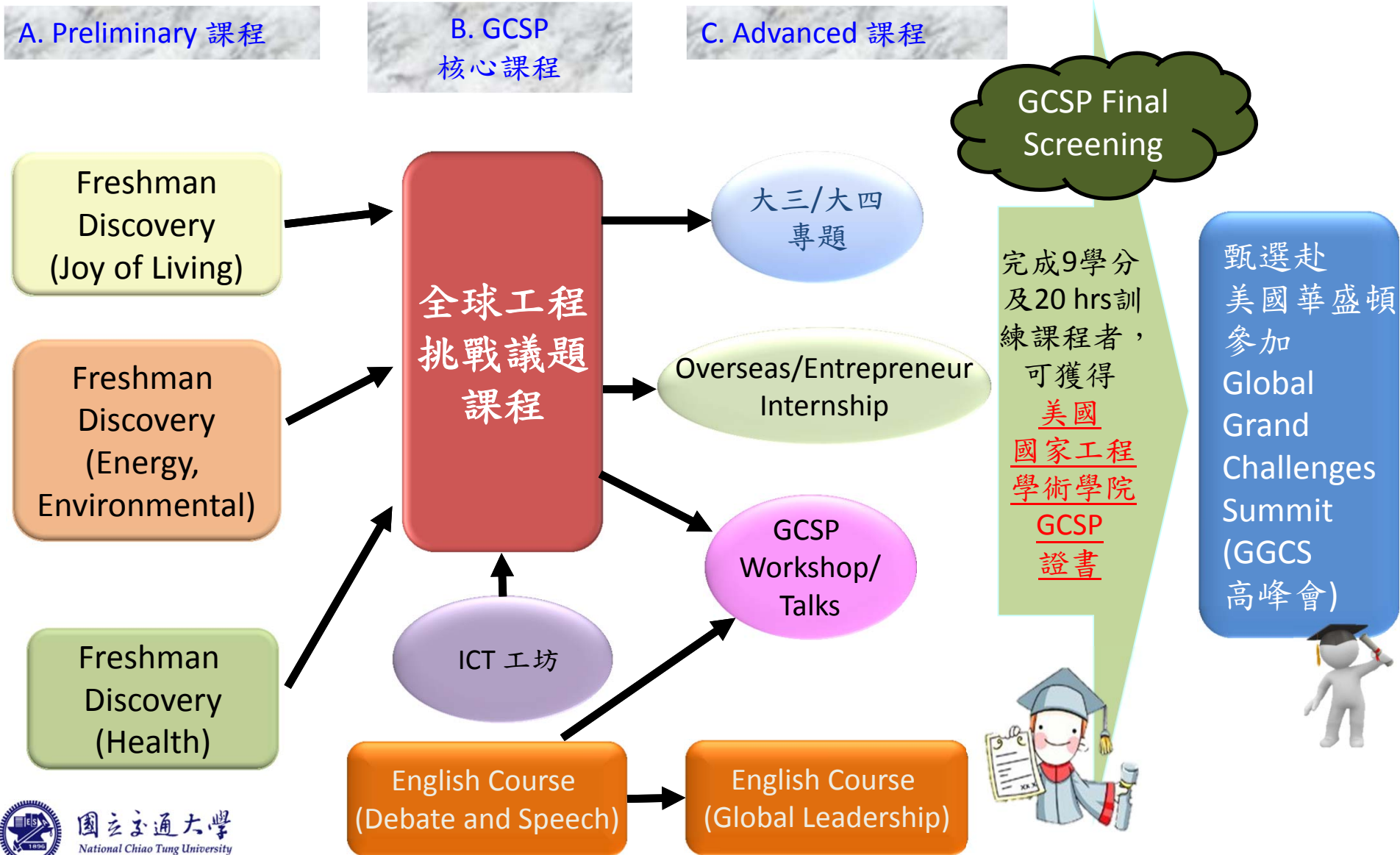
全球工程領袖培育計劃 (2/4)

- 培育計畫：
 - 規劃從大一先修課程-電機學院院級「新鮮人領袖培育及探索系列課程」中加入Grand Challenge Scholars Programs全球工程議題
 - 例如: Energy、Environmental Care、Health、Joy of Life
 - 大二大三期間開設GCSP核心課程並佐以英文課程探討全球工程關注議題，透過辯論、報告進行
 - 大三大四進階課程於專題融入全球工程議題之探討、結合本校ICT工坊、跨域學程、Entrepreneur Internship、GCSP Workshop及演講活動之辦理
- 期許同學具有前瞻之國際觀、企業觀以及創新與獨立思考之能力，進而達到本院教育目標「成為專業、創新、服務、具有發掘、分析、解決問題、創新的能力及擁有國際視野與社會責任感」之科技人



全球工程領袖培育計劃 (3/4)

Starting from January, 2018



全球工程領袖培育計劃 (4/4)

- 9學分NCTU GCSP課程 (Example)
 - 新鮮人領袖培育及探索系列 **Freshman Leadership Cultivation and Discovery (2學分)**
 - 全球工程挑戰議題課程 (3學分): **軟體創意專題、嵌入式系統設計、物聯網基礎程式設計：應用Ameba板、智慧電子創新應用實驗、感測器基礎實作與嵌入式系統應用、雲端運算與巨量資料分析、感測與智慧系統....**
 - **English Course (2學分)：英語演說與談判（進階）、英語演說與辯論（進階）、國際現勢討論（進階）、英文演說:撰寫與發表（進階）**
 - 大三/大四專題 (2學分): **GCSP-related topics**
 - **ICT工坊 (2學分): GCSP-related topics**
- 20 hours 訓練課程
 - **Summer Internship (UCLA, USC, UC Davis)**
 - **NCTU GCSP Workshops**
 - **NCTU GCSP Talks**
 - **Summer Entrepreneurship**

經審查達成以上學分要求通過者，將於每年年底頒發證書。



新鮮人領袖培育及探索系列

- 訓練學生讀、寫、表意、思辯、創意、獨立解決問題、收集資料等能力的培養。
- 內容涵蓋電機專業簡介課程、最新研究發展趨勢之概論及業界參訪。業界參訪安排台積電、聯發科、聯華電子、華碩、友達光電、旺宏...等高科技產業，讓同學走出校園，開拓眼界。



NCTU ICT Co-Working Space Program



Engineering Building I & III
Innovative Common Co-Working
Space: Prototyping



Library
Creative Common Co-Working Space:
Ideas Generation



Digital Factory
Technology Common Co-Working Space:
Fabrication & Tool Making



● ICT Co-Working Space Program

- Undergraduate Program & Labs: Embedded System, IoT, Drone, Robot, VR/AR, 3D Printing, Network Security, IC Design, HCI, Electronics, Bioengineering
- Graduate Entry-Level Program & Labs: Photonics, BioICT, RF Electronics, Advanced IC Design
- Common Co-Working Space: Prototyping, Ideas Generation, Fabrication & Tool Making, Digital Factory

GCSP Core Course No. 1 – AI Driving Competition

To Cultivate Multidisciplinary Teamwork, Multicultural and Leadership Competencies

- NCTU will host the AI Driving Olympics in NIPS (Neural Information Processing Systems)
 - Top conference in machine learning
- NCTU will build a competition site, along with ETHZ, Georgia Tech, University of Montreal, and Tsing Hua University, nuTonomy, and Amazon
- NCTU GCSP students will help to organize this event in December 2018

NIPS 2018 Live Competition Proposal

The AI Driving Olympics

Andrea Censi*	Liam Paull	Jacopo Tani	Scott Livingston
Julian Zilly	Ruslan Hristov	Oscar Beijbom	Eryk Nice
Sunil Mallya	Justin De Castri	Nick Wang	Qing-Shan Jia
Tao Zhang	Stefano Soatto	Magnus Egerstedt	Yoshua Bengio
	Emilio Frazzoli		

ETH zürich

Georgia Tech

Université de Montréal



國立交通大學
National Chiao Tung University



清華大學
Tsinghua University



2016



2017



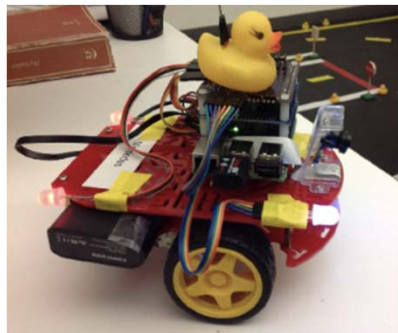
2018



國立交通大學
National Chiao Tung University

From 0 to 1, from 1 to 100

- From 0 to 1 (trabant); from 1 to 100
- From teaching to research
 - NIPS AI Driving Olympics
 - Duckietown -> DuckiePond -> RobotX
- Lucky to be in NCTU
 - Great Leaders, Mentors, and Colleagues



We were thinking that the marine version of DuckieTown would be called "DuckiePond".



國立交通大學
National Chiao Tung University

2016/01/03 from Andrea Censi

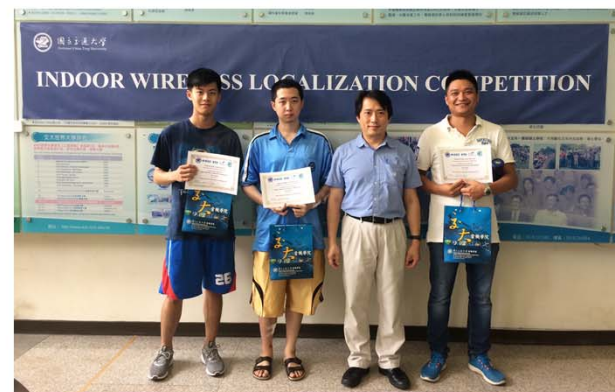
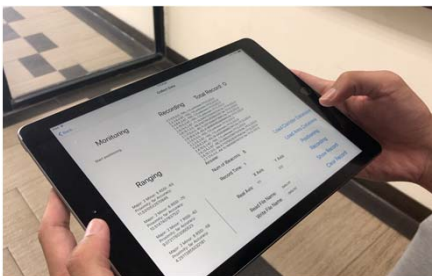
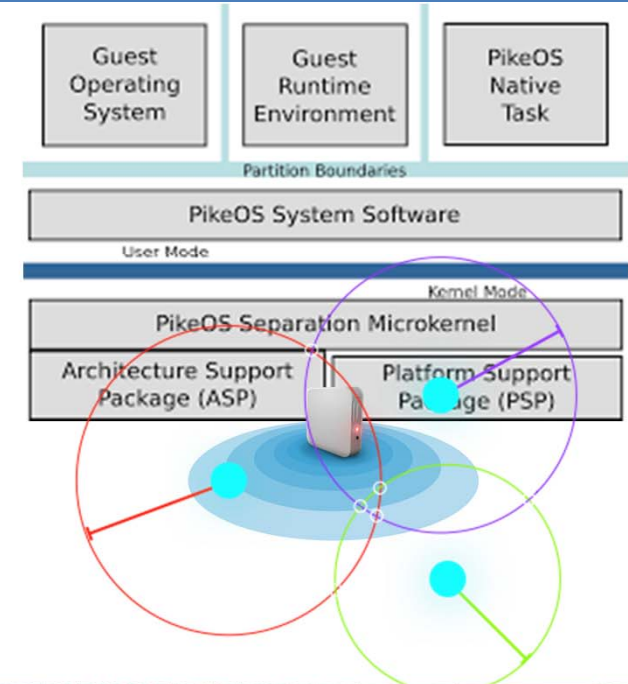
Act Together, We Go Far

- Students Organize,
Students Run!



GCSP Core Course No.2 – ICT-enabled Elder Care

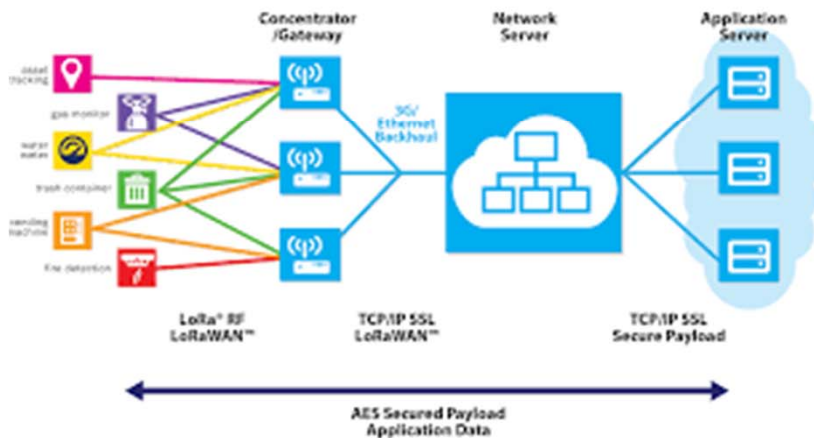
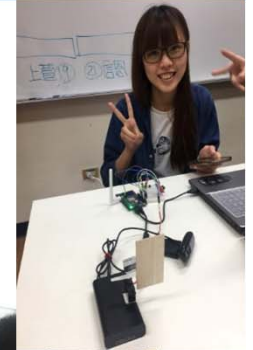
- Problem: Social elder care
- Project: **Geolocation solutions** for positioning elder people at community or hospitals
 - Student competition on design and implementation of Indoor wireless localization and tracking



GCSP Core Course No. 3

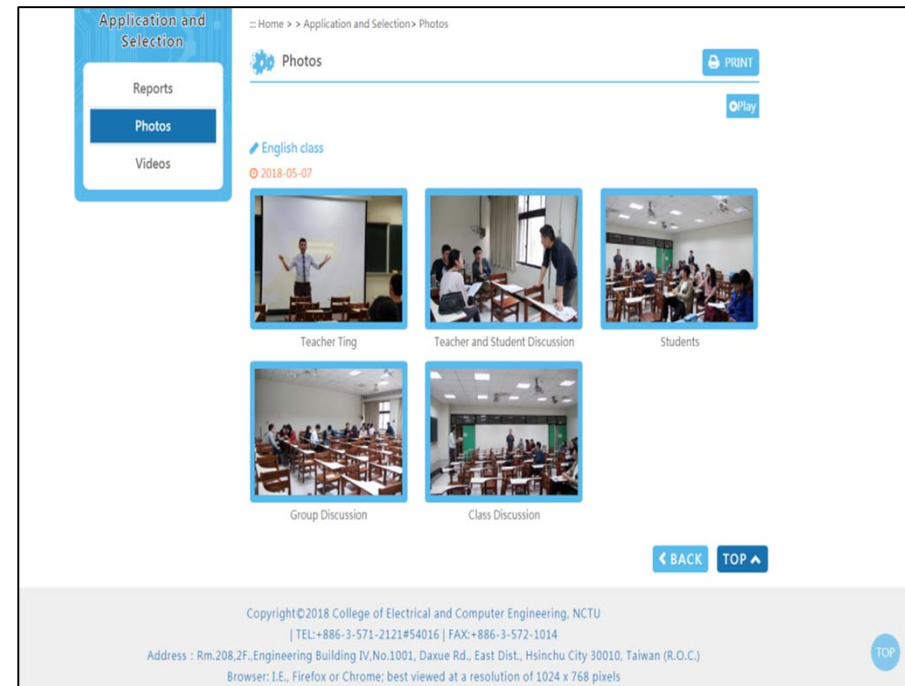
- IoT Infrastructure for Environmental Care

- Problem: Energy-saving for smart buildings
- Project: effectively smart sensing and monitoring systems
 - Design and implementation of LoRa-enabled sensor networks
 - Starting from global view, system design, to technical design



NCTU GCSP Website

- NCTU GCSP website has been established since March 2018
 - news, overview, curriculum, admission and enrollment, achievements and activities, FAQ, other links, and sitemap
 - <http://gcsp.ece.nctu.edu.tw/home.aspx>



申請加入全球工程領袖培育計劃

- Applying for NCTU GCSP
 - 申請表(Application Form)
 - 自傳(Personal Bio)
 - 參加課外活動(Extra-curriculum Activities)
 - 英文程度證明(Optional)
- 繳件截止日期(Submission Deadlines): **January 13, 2020**
- 公告錄取名單(Notification of Acceptance): **February 17, 2020**
- NCTU GCSP 迎新: **February 26, 2020**
- 聯絡人(Contact Window): 廖小姐 (ED208), College of ECE



Summary

- Student Transformation
 - Cultivate student's leadership by engaging and exploring product/service solutions for global grand challenges
 - Inspire students to become future leaders with global vision and international mobility
 - From “know how mainly” to “know why and what first”

Thank You for Your Attention !

