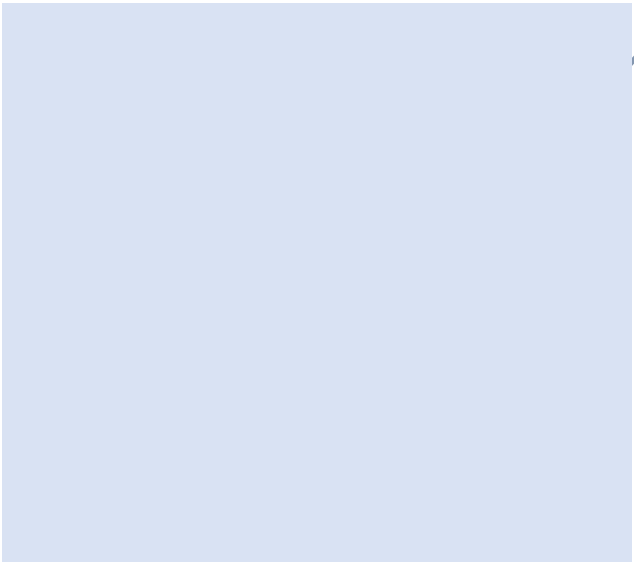# 第二屆國際跨領域垂直整合專題學程研討會-

智慧科技跨領域應用與實作學程成果交流暨跨領域專題演講

（2019 International VIP Conference）

地點：臺灣花蓮國立東華大學

日期：2019/1/14-16

2019 International VIP Conference

Location

National Dong Hwa University, Shoufeng, Hualien, Taiwan

Venue: Science & Engineering Building II, Lecture Hall (I) (Commencement: 1/15/2019)
Environmental Exposition Center, Room C102 (Workshop: 1/16/2019)

Features and Focus

National Dong Hwa University (NDHU) and Inha University from the Republic of Korea will jointly hold the 2019 International Vertically Integrated Projects (VIP) Conference. Prof. Joohyung Kim will lead a group of 21 students and faculty through three days of in-depth discussion and exchanges, fusing the local features of Hualien, promoting collaboration between the two schools, and highlighting the concerns of society.

Dynamic Workshop

The Conference will be held from January 14th to 16th at NDHU. In order to promote in-depth exchanges and explore technology integration, this Conference will adopt a "Design Thinking" approach with a living lab concept at its core. It will foster the practical integration of science, humanities, business, and societal concerns, with a focus on the pressing issues of Hualien. This facilitation model workshop will transform the traditional conference with its inside out and bottom-up participation style learning activities opening up a totally new paradigm.

Living and Practical Skills

This Conference will emphasize learning-based change with the key targets of Cultivating Students' Vital Capacities for the 21st Century and SDG-Sustainable Development Goals. It is geared at developing the fundamental 4C and IT technology students must be equipped with—critical thinking and problem solving, effective communication, collaboration and building, and creativity and innovation.

This Conference will be different from the one-way communication method of our first session in which the two universities published their VIP programs in competition mode with evaluations conducted and awards granted. There was a lot of inspection and observation of each other's efforts, but with very little interactive exchange. In addition to the existing special topic seminar and competitions, this Conference will expand opportunities for students to engage and collaboratively learn. The first step will be to participate in an interactive Design Thinking workshop to stimulate ideas. We anticipate that the South Korean students who come to visit us will gain a deeper understanding of Hualien and Dong Hwa University, connecting the disciplines of technology, humanities and society to cultivate the capacity of students to solve the real-world issues faced in daily life. Ultimately, through these interactions and exchanges, we hope that students will be able to modify their own approach to learning, and together, spark impetus for transdisciplinary project collaboration, planning, and know-how throughout Asia.

Sustainability and Local Concerns

A wide diversity of teams will be participating in this Conference including an "audio board game" designed for the visually impaired; turning scrap bicycles into the creation of resource sustainability through "cooperation, sharing, and hands-on"; and designing the safest and most comfortable navigation safety helmets for motorcyclists. Students from different countries and a diversity of disciplines will be participating and engaging in dialogue. NDHU will be specially presenting a "Bike Co-op" program as a case study, sharing examples of the ways our university has long been dedicated to making a positive impact on Hualien. Through these types of examples, we can learn from, explore, and discuss real-world issues in our community, applying transdisciplinary knowledge to make proposals that provide solutions for society. The hallmark of this Conference will be transdisciplinary and transnational team-based learning that creates a new a type of learning organization platform.

We hope that after this in-depth exchange study, students from Dong Hwa and Inha will become regional alliance partner VIP schools in Asia, and continue to exchange and develop transnational collaboration teams, making VIP operations an important catalyst for change in higher education innovation.

Cultivating Transnational Talent—VIP & BRICK

The origins of VIP started back in the fall of 1995 with the Engineering Projects in Community Service (EPICS) learning design program at Purdue University. This program involved the partnership of student teams and local and international grassroots organizations, cooperating to resolve human, community and environmental concerns. These community cooperative partnerships provided a more worthwhile and valuable learning experience. Later, GA Tech built on these foundations to form VIP. At the 2018 annual meeting, there were over 60 representatives from 30 higher education institutions nationwide.

Since 2017, NDHU has been receiving assistance and support from the Ministry of Science and Technology. Under the support of the Ministry of Science and Technology of Taiwan, NDHU President Han-chieh Chao Ph.D has been working together with the faculty from our university's eight colleges to create a transdisciplinary educational program. The Vertically Integrated Projects Program (VIP), which is being implemented by prominent universities across the United States, was introduced and has culminated in the establishment of the Smart Technology πPBL Transdisciplinary Program with the focus on smart technology applications.

During the 2017 academic year, the NDHU's Community Participation Office and the General Education Center was the first university in Taiwan to launch the BRICK—Break/Redefine/Imagine/Catalysis/Kindle—self-learning curriculum. The curriculum is designed entirely by the student, from the topic to the learning method, with an emphasis on real-world learning and application. Through the "practical orientation of self-directed

learning," the students themselves will independently grow and expand the topics in the existing curriculum, plan their own studies, and "recognize credits" at the end of the semester. This completely open learning style is gradually taking root throughout Taiwan's higher education institutions.

Since the implementation of BRICK during the second semester of the 2017 academic year, 15 student teams have proposed plans for self-learning projects, including indigenous peoples outreach, cultural development industry, innovation and entrepreneurship, environmental protection, rural children's educational outreach, and international competition planning. These initiatives directly coincide with the spirit of EPICS.

Whether it is EPICS or BRICK, as well as the current VIP, they all have the following characteristics: 1) Long-term participation of students, 2) Large team structure and continuity, 3) Transdisciplinary teams, and 4) Team consultants from a diversity of disciplines.

Origins of Conference Cooperation Between Our Universities

Since NDHU began receiving assistance and support from the Ministry of Science and Technology in 2017, NDHU President Han-chieh Chao has been working together with the faculty from our university's eight colleges to create a transdisciplinary educational program. The Vertically Integrated Projects Program (VIP), which is being implemented by prominent universities throughout the United States, was introduced and has culminated in the establishment of the Smart Technology πPBL Transdisciplinary Program. This Program focuses on cultivating the transdisciplinary talents needed for the emerging smart technology industry and will equip students with the skills and knowledge necessary to gain a competitive edge in job market, providing the professional talent to fuel our nation's focus on the smart technology industry for future economic development.

Inha University also places emphasis on cultivating transdisciplinary talent and has been implementing the VIP program for many years, accumulating an abundance of experience and rewarding results. We continue holding this Conference, providing a platform for our universities to exchange experiences on transdisciplinary project education and research. We anticipate that our cooperation in cultivating VIP talents will produce even more impressive and impacting results, while also increasing the international vision of our students.

2018 International VIP Conference

NDHU hosted the first Conference (2018 International VIP Conference), which commenced on January 8, 2018 and lasted for one week. We invited Prof. Hale Kim from Inha University from South Korea to lead a team of 22 students who had been working on transdisciplinary projects. At the Conference, our universities exchanged experiences on transdisciplinary project education and implementation, signed a student exchange program agreement, and established the content for a cross-national education and research cooperation agreement. As part of the Conference, we also held the Smart Technology Transdisciplinary

Applications and Implementation Exchange Achievements and Transdisciplinary Conference.

At this Conference, NDHU President Han-chieh Chao and Inha University Prof. Hale Kim signed an MOU for a joint teaching and research cooperation plan and exchange student program, as we looked forward to it serving as a prelude to unveiling future transdisciplinary talent cultivation and an exchange student program between the two universities. The special topic project and poster competition portion of the 2018 International VIP Conference was held for a two-day period and commenced on January 11, 2018. For the special topic project competition, five teams who had participated in the transdiciplinary project program with the best projects were selected to participate from both NDHU and Inha University. And there were a total of 16 teams participating in the poster competition.

VIP Development—From the College of Science and Engineering Lab Project Planning Phase to Participatory Action Design

The origins of VIP started back in the fall of 1995 with the Engineering Projects in Community Service (EPICS) learning design program at Purdue University. Prof. Edward J. Coyle was the principle promoter and the program worked towards forming partnerships among student teams and local and international grassroots organizations, cooperating to resolve human, community, and environmental needs. These community cooperative partnerships provided a more worthwhile and valuable learning experience.

EPICS students earn credits by participating in team-based design projects that address the engineering, computing, and technology needs of local and global communities. Teams form partnerships with non-profit community organizations, educational institutions, and government agencies to provide services for local and global communities.

In 2009, Edward J. Coyle moved to Georgia Tech, where he transformed EPICS into VIP-Vertically Integrated Projects, actively participating in a wide diversity of specialized disciplines and fields, organizing annual exchange activities, and encouraging regional alliances and learning. At the 2018 annual meeting, there were over 60 representatives from 30 higher education institutions nationwide.

VIP Team Operation Features

Long-term Student Participation

Complete at least one full semester. Long-term participation gives students the opportunity to experience the entire life cycle of a team project, with academic and professional growth creating an ongoing process of learning and development. In addition to specialized knowledge, students will learn the important skills of teamwork, leadership, system design and project management.

Large Team Structure & Continuity

Encourage large teams (8-20 members). Professors, graduate students, and undergraduate

students can form vertical teams. These teams will help maintain partnerships that last for many years.

Transdisciplinary Teams

Teams are composed of members from across as many disciplines as possible to ensure that both the project partners and students achieve the best results.

Team Consultants

Each EPICS team is guided by a qualified consultant. The pool of consultants consists of experts from a broad diversity of disciplines and fields, both academic and professional.

Opening Ceremony

time		program	
～09:30	簽到		
09:30~09:35	主持人 開場	● 介紹會議主席-林信鋒教務長 ● 介紹仁荷大學教授- Prof. Joohyung Kim ● 介紹本校跨領域教師團隊	張桂芬 引導師
09:35~09:50	致歡迎詞	● 由主持人邀請教務長上台致詞	教務處 林信鋒教務長
09:50~10:45	專題演講：3D Printing Technology Combination between Flexible and Strong- Exoskeleton and Beyond	● 由主持人邀請韓國仁荷大學 Prof. Joohyung Kim 進行演講	韓國仁荷大學 Prof. Joohyung Kim
10:45-11:00	Q&A	● 由主持人協助詢問現場是否有與會人員欲向 Prof. Joohyung Kim 提問	張桂芬 引導師
11:00-11:05	大合照	● 由主持人邀請所有與會人員至講台留影	張桂芬 引導師
11:05~	禮成		

|

趙涵捷 校長
President
Prof. Han-Chieh Chao | President of National Dong Hwa University（NDHU）
學歷：美國普渡大學電機工程學系博士
Ph.D. School of Electrical Engineering, Purdue University
經歷：
國立宜蘭大學校長 President of National Ilan University
教育部電算中心主任 Director of Computer Center of Ministry of Education
國立宜蘭大學圖書資訊館館長暨電算中心主任 Director of Library and Information Center, NIU
國立東華大學電機系主任 Director of Electrical Engineering, NDHU
研究領域：
新世代網際網路協定與整合技術 IPv6
行動網路運算 Mobile Computing
跨層式設計概念 Cross-Layer Design
雲端運算 Cloud Computing
物聯網 Internet of Thing（IoT）
量子計算 Quantum Computing |

Moderator

|

林信鋒 教務長
Prof. Lin, Shin-Feng | Dean, Office of Academic Affairs
Professor, Computer Science and Information Engineering
學歷：Mississippi State University 電機博士
經歷：
　　國立東華大學教務長（2016/01/23~）
　　國立東華大學海洋科學學院院長（2016/01/23~）
　　國立東華大學理工學院院長（2012/11~2016/02）
研究領域
　　Signal Processing
　　Digital Image / Video Processing
　　Watermarking (Image / Vide0, Audio)
　　Image / Video Compression |

Honored Guest of Inha University, South Korea

|

Prof. Joohyung Kim | Professor, Dept. of Mechanical Eng. Inha University
Director, INHA IST-NASA Joint Research Lab (Center)
Director, General Motors-PACE Center
Director, 3D Printing Center
Lab. of Intelligent Material/Devices and Thermal Control System |

電機工程學系副教授

Department of Electrical Engineering

研究領域：Wireless Network, distributed randomized algorithms and scientific cloud computing(無線網路、物聯網（智慧聯網）、分散式演算法、雲端計算)

陳震宇　副教授

Prof. Jen-Yeu Chen

自然資源與環境學系特聘教授
兼任社參中心主任與環教中心主任
Department of Natural Resources and Environmental Studies

研究領域：鄉村社區營造、社區/環境教育、人文生態與教育、環境教育課程教學設計、質性研究、行動研究、多元差異與弱勢學習

顧瑜君教授

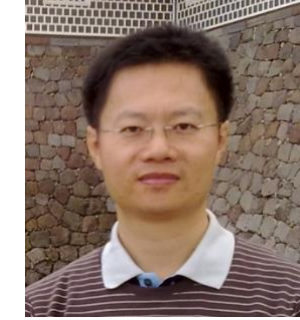Prof. Yu-chun Ku

朝邦文教基金會董事及核心引導師，是國際引導者認證專業引導師。

IAF Certified™ Professional Facilitator; IAF Certified™ Assessor

善於運用各種引導的方法，提供符合組織需求的流程規劃與實際帶領的多元引導服務。此外，也整合引導的方法與技巧融入在創意思考以及危機管理等培訓課程中，透過團隊引導的方式，帶領團隊學習、探索管理新領域以及建立領導力。

張桂芬國際引導師

Jackie Chang

 吳秀陽主任 Prof. Shiow-Yang Wu	資工系教授兼系主任 Department of Computer Science and Information Engineering 研究領域：cloud computing and big data processing, data & knowledge bases, mobile & pervasive computing, distributed processing, intelligence information systems and service computing (雲端大數據處理、資料庫與知識庫、行動與普及運算、分散式系統、網路服務)
 顏士淨教授 Prof. Shi-Jim Yen	資工系教授 Department of Computer Science and Information Engineering 研究領域：artificial intelligence, Coumpter Match,Machine Learning (人工智慧、電腦對局、機器學習)
 羅壽之副教授 Prof. Shou-Chih Lo	資工系副教授 Department of Computer Science and Information Engineering 研究領域：obile Computing, Wireless Network, Information Services（行動計算、無線網路、資訊服務）
 陳旻秀 副教授 Prof. Min-Xiou Chen	資工系副教授 Department of Computer Science and Information Engineering 研究領域：software defined network, cloud network and resource management in wireless systems (電腦網路、雲端網路、無線網路)
 賴志宏 副教授 Prof. Chih-Hung Lai	資工系副教授 Department of Computer Science and Information Engineering 研究領域：learning technology, computer assisted language learning, and mobile learning (數位學習、學習科技 行動學習)

Agenda

Time	1/14 @環解中心 C102 Environmental Exposition Center, Room C102	1/15 @理工二館第一講堂 Science & Engineering Building II, Lecture Hall (I)	1/16 @環解中心 C102 Environmental Exposition Center, Room C102
09:30~11:00		(9:30-9:50)Opening Remark by NDHU (9:50-11:00)NDHU & IU Students Seminar by Prof. Joohyung Kim(IU)	參與式設計思考 Social Participatory Community ⊙顧瑜君老師引言 ⊙引導師-Jackie（30mins） 單車合作社經驗分享(15mins)
11:00~12:00		Lunch Box	
12:00~12:30			Lunch Box
12:30~13:00		NDHU & IU Students prepare their presentations（Oral, Poster）	
13:00~13:30			
13:30~15:00		Student VIP Project Demo & Competition #1（Conference on VIP）Oral Session（Both NDHU & IU） ⊙Gena 主持開場 ⊙顏士淨老師	參與式設計思考 Social Participatory Community ⊙顧瑜君老師 ⊙引導師-Jackie
15:00~16:00		Student Project Demo & Competition #2（Conference on VIP） Poster Session（Both NDHU & IU） ⊙顏士淨老師	參與式設計思考-對話交流 Dialogue for Positive Social Change ⊙顧瑜君老師 ⊙引導師-Jackie
16:00~18:00	Check-in ⊙顏士淨老師		
18:00~19:00	Dinner	Dinner	Dinner Box
19:00~20:30	圍棋相見歡 ⊙顏士淨老師	顧瑜君老師 引言 5mins→Jackie 老師帶棉花糖 90mins→頒獎 10mins ⊙顧瑜君老師 ⊙引導師-Jackie	Design Thinking 參與式設計思考-行動策略擬定 ⊙顧瑜君老師 ⊙引導師-Jackie

Introduction of NDHU Students Teams of Competition

組別	Project Name	Name	Major	專題簡介
1	Crobstruct: Board game for the visually disabled	李翰寬 Li-Han Kuan	Computer Science and Information Engineering	由於我們的桌遊是以聽覺為主，因此能觸及視覺障礙者，使得視覺障礙者也能體驗桌遊的樂趣。視障者依程度不同，從弱視到全盲，以及不同狀況所產生的視覺障礙，其定義為因視力缺陷而影響生活者。經過調查，本團隊得知，現行於市面上的桌遊均含有大量的視覺元素，如圖卡、文字敘述等，即使非全盲人士，依然難以辨識與閱讀，無法藉此與人同樂。「如能藉由本團隊設計之「聽覺桌遊」遊戲過程，視障視健雙方得已交流生活經驗，可消彌彼此的距離，同時提高視障人士之自我認同。
		郭新拳 Kuo-Xing Chuan	Computer Science and Information Engineering	
		劉思怡 Si-Yi Liu	Department of Sociology	
		林韋辰 Wei-Chen Lin	Computer Science and Information Engineering	
		周慈恆 Tzu-Hen Chou	Department of Sinophone Literatures	
		何明叡 Ming-Jui Ho	Electrical Engineering	
2	AI Finance	Maria Elsa	Computer Science and Information Engineering	Artificial intelligence is a popular technology currently, and it is powerful and useful in several fields. In this project, we concentrate on how to reap the benefits in the stock market by using AI technology. We suppose the previous trading data is a valuable information that needs to be memorized, so we choose Long Short-Term Memory (LSTM) networks to train our model. LSTM is an extension for recurrent neural networks, which basically extends the memory by preventing the vanishing and exploding gradient problem. We capture the data from the last 30 trade date to predict the stock's trendline in 10 days in the future. And 70% of the data is used for training and 30% of the data is used to evaluate accuracy. Fortunately, the accuracy we test for 10 Constituent stocks in Taiwan Top 50 ETF is at least 70%.
		林欣儀 Hsin-I Lin	Computer Science and Information Engineering	
3	Machine Translation for	陳亭妤 Ting-Yu Chen	Computer Science and Information Engineering	Language is an indispensable medium for the development of world civilization, but nowadays many minority languages

組別	Project Name	Name	Major	專題簡介
	Taiwanese Indigenous Languages			have gradually disappeared and become endangered languages. According to a survey, the younger Taiwanese indigenous peoples, the lower the vitality of the indigenous languages, which presents a potential crisis of indigenous language loss. We choose several Taiwanese indigenous languages, the Amis, the Atayal, and the Bunun, building a "Taiwanese Indigenous Languages Translation System." By Deep Learning, it is able to convert indigenous languages to Mandarin automatically through the Machine Translation. We hope that we can promote the learning of Taiwanese indigenous languages and enhance the inheritance of endangered languages.
4	Ironmet+	李珮璿 Pei-Hsuan Lee	Computer Science and Information Engineering	Ironmet+結合了幾項機車騎士最常遇到的困擾，做出了四套情境：夏日炎炎：不想戴安全帽騎車出門；夜晚騎車：進入隧道或遭遇臨時狀況，擔心後方來車看不清楚；查詢地圖：一直停下來使用手機看地圖十分不便；行車紀錄：不想要另外買個大機器黏在安全帽上。針對所遇四項情境使用智慧溫控來解決戴安全帽不舒適的問題；後方警示問題交給智能警示燈改善；運用 Google Maps 的導航模式，連結藍芽喇叭，不再低頭緊盯手機。
		楊佩姍 Pei-Shan Yang	Computer Science and Information Engineering	
5	Automatic Data Collection for a Big Data System	趙宣筑 Hsuan-Chu Chao	Computer Science and Information Engineering	本專題計畫主要的研究重點是「大數據系統之全自動資料收集」。我們以工業 4.0 的準則，針對本實驗室現有的 Welfare 網站日誌全自動收集系統進行檢視，分析出現有系統的優點與缺點。
6	Autonomous moving car	蕭業家 Yeh-Chia Hsiao	Electrical Engineering	我們希望能利用簡單的感測器搭配移動平台，製作出能夠簡單的根據軌跡達到簡單的巡邏及避障功能的巡邏車，除了簡易巡邏及避障功能，我們還加入了網路攝影機、遙控器及簡易機械臂，達到人工控制及簡單的手臂夾取功能。

Introduction of Korea Students Teams of Competition

組別	Project Name	Team Name	姓名	Major
1	The Developments Method based	EVM	이진우	Architectural

組別	Project Name	Team Name	姓名	Major
	on CO2 Emission Information from Construction Equipment for Greenhouse Gas Regulations	(Emissions Value Measurement)	LEE JIN WOO	Engineering
			권재민 GWON JAE MIN	Architectural Engineering
			최영준 Choi Young Jun	Architectural Engineering
2	Big-data based, Public bike delivery by seoul city bus using optimal algorithm	Infra-Maker	이종법 LEE JONG BUB	Computer Engineering
			김병준 KIM BYUNG JOON	Mechanical Engineering
			박형순 PARK HYEONG SUN	Civil Engineering
3	Obstacle Removing & Self Refueling Autonomous Vehicle using Arduino.	FAN	이유진 LEE Yu Jin	Information and Communication Engineering
			박세영 PARK SE YOUNG	Electrical Engineering
			이범진 LEE BEOM JIN	Aerospace Engineering
4	Study on Mars exploration robots through Opportunity	Opportunity	조시영 JO SI YOUNG	Mechanical Engineering
5	FDM 3D Printing Applications	Additive Manufacturing	권혁배 KWON HYEOK BAE	Mechanical Engineering
			강선호 KANG SUN HO	Mechanical Engineering
6	High Strength Bridge	H&N	한승수 HAN SEUNG SU	Mechanical Engineering
			남관형 NAM KWAN HYEONG	Mechanical Engineering
7	Autonomous Driving Vehicle with Enhenced Localization	NoA	박현빈 PARK HYEON BEEN	Mechanical Engineering
			전지훈 JEON JI HUN	Electornic Engineering
			이홍순 LEE HONG SUN	Mechanical Engineering

組別	Project Name	Team Name	姓名	Major
8	Removal of Nox and VOC from factory chimneys using Photocatalyst	Nox No more	오혜원 OH HYEWON	Chemical Engineering
			안승현 AN SEUNG HYUN	Chemical Engineering
9	For your healthy life, Smart PushUp Machine(S.P.U.M.)	Fuerta	이응수 LEE EUNGSOO	Electrical Engineering
			심기훈 SHIM KIHOON	Electornic Engineering

Introduction to the NDHU Bike Co-op

The Bike Co-op was formed independently by a group of students in 2012. Aware of the problem with the huge number of abandoned bicycles on campus every year, they hoped to rely on a bit of technology and labor to find new life and owners for these abandoned bicycles. This would effectively realize the initiatives of resource reuse and environmental concern. As they continued their efforts and concerns for these initiatives, they also began to emulate bicycle cooperatives abroad and began imagining how a group of people can use a bunch of scrap bicycles to promote environmental education, community service and bicycle culture. In the process, they built up a learning network of "cooperation, sharing, and hands-on," and through the implementation of specific practices and programs, devised the capacity to respond to the material economy and resource sustainability issues within the capitalist society.

Introduction to the NDHU Hult Prize

The Hult Prize is a business proposal competition for undergraduate and graduate students worldwide sponsored by the Hult Prize Foundation in the United States. It encourages all types of innovative ideas aimed at solving the pressing problems that society faces. In October of each year, the former U.S. President Bill Clinton announces the topic. Since 2017, NDHU students have been participating in this competition, developing their organizational skills through the preparation process of international competition. Through this competition, participating teams can learn new knowledge, obtain resources and then give back to the university and communities.