



# 2017 CDIO Asian Regional Meeting

Conceive Design Implement Operate

13 – 15 March 2017

Rajamangala University of Technology Thanyaburi and  
Faculty of Engineering, Chulalongkorn University  
THAILAND

## Message from the main organizer of 2017 CDIO Asian Regional Meeting



It is a great honor for me to give a cheerful welcome for this landmark 2017 CDIO Asian Regional Meeting on behalf of Rajamangala University of Technology Thanyaburi.

Through this CDIO Asian Regional Meeting, we would like to engage with all of you in an open and constructive dialogue about worldwide CDIO initiative as a new trend of educational process.

Designing a curriculum is a multifaceted challenge that includes questions about learning goals, such as which competencies are important for professional practice? And what should

the relative emphasis be among them?

Finally, I would like to thank everyone for their support to 2017 CDIO Asian Regional Meeting, CDIO initiative is like a journey without a finish line: simply must endure and continue to push forward.

My warmest welcome and regards to all.

### **Assoc. Prof. Dr. Prasert Pinpathomrat**

President Rajamangala University of Technology Thanyaburi

Thanks to the spirited works of the organizing committee, the technical program committee, keynote speakers and the invited speakers and excellent program have been assembled to cover a broad spectrum of interesting topics for 2017 CDIO Asian Regional Meeting.

I do believe that “Education is the most powerful tool for changing the world” and let us support the Worldwide CDIO Initiative for the sake of change in the globally competitive world.

Lastly, may I congratulate everyone for the hard work and dedications for this successful event. “Today whatever you have, you earn it and keep this spirit up always. Many successes are yet to come.”



### **Asst. Prof. Dr. Sommai Pivsa-Art**

Vice President Rajamangala University of Technology Thanyaburi



I would like to take this opportunity to express my sincere gratitude to all people who work for the success of 2017 CDIO Asian Regional Meeting. I deeply appreciate the very strong support given by the distinguished participants coming from the different corners of the world.

Education is important in life because it gives people the skills and tools they need to navigate the world. CDIO curriculum is very important to equip the young generation of students to be ready and prepared to meet the demands of a highly competitive global markets of workforce.

### **Assoc. Prof. Dr. Natha Kuptasthien**

Assistant to the President for International Relations and  
Director of International Strategy Division  
Rajamangala University of Technology Thanyaburi

# Message from the co-organizer of 2017 CDIO Asian Regional Meeting

Year 2017 is a special year for Chulalongkorn University as we celebrate our centennial anniversary. We are proud to be one of the most outstanding and prestigious universities in Thailand. Founded in 1917, Chulalongkorn University has produced countless graduates with high academic ability, multidisciplinary knowledge, initiative and innovative skills in teaching and conducting research. We have continuously made contribution to international academic and research communities, and transformed knowledge to drive the sustainable development of Thailand and our society. We continue to work with our four strategic principles, which are 1) Human Capital, 2) Creation of Knowledge & Innovation, 3) Societal Transformation, and 4) Global Benchmarking.

In addition to our centennial anniversary celebration, on behalf of Chulalongkorn University, I am honored and delighted to welcome the executives, faculties and staff members from CDIO collaborators to “2017 CDIO Asian Regional Meeting”. I am confident that this regional meeting will benefit both faculty members as well as students. Particularly in the area of integrated knowledge and engineering innovation development, which conforms to our vision and missions.

## **Professor Dr. Bundit Eua-arporn**

President, Chulalongkorn University



Faculty of Engineering, Chulalongkorn University or Chula Engineering is a higher education institute that produces engineering students and innovations for the world society. It is arguably the most respectable engineering school. Throughout its history of 100 years, Chula Engineering has continually educating engineering graduates who are capable, just, and fitted to lead the Thai society according to the founding principles of Chulalongkorn University.

Chula Engineering continually improves its capability by adopting new techniques, encouraging high quality research in various fields, and collaborating with international partners. In 2017, Chula Engineering is pleased to serve as a Collaborator for the 130 member institutes. It is one of only two institutes in Thailand to have this honor from the CDIO Worldwide Initiatives- Asian Region to host the “2017 CDIO Asian Regional Meeting” with the Rajamangala University of Technology Thanyaburi. This will be another important step for Chula Engineering to continue

the advancement of knowledge and technology for the benefits of Thai and global society in the future.

## **Associate Professor Dr. Supot Teachavorasinskun**

Dean, Faculty of Engineering, Chulalongkorn University

A warm welcome to all of you, dear educators.

Engineering advancement has brought much benefit to the modern society. Yet, we as educators have been through quite a difficult time, to say the least. Students, born and raised in digital era are in stark contrast to our generation. The amount of knowledge and complexity of engineering discipline are daunting to educators, old and new. Today’s engineering profession even asks for more – all those long lists of skills and attitudes.

Striving for the solution to these challenges for the changing world, we at Engineering Education Initiative, Chulalongkorn University have been collaborated with RMUTT, with continued support and friendship from Singapore Polytechnic, in implementing CDIO framework for all of our undergraduate programs. I can assure you that it is not an easy task to do. Yet we are convinced that it is the right direction and we take one step after another. And we believe that CDIO framework can answer your calling as well.

Either you are new to CDIO or about to implement CDIO at your school, we welcome you with open arms. Not only us, our wonderful network of CDIO collaborators awaited for you. Listen to yourself, and take that first step.

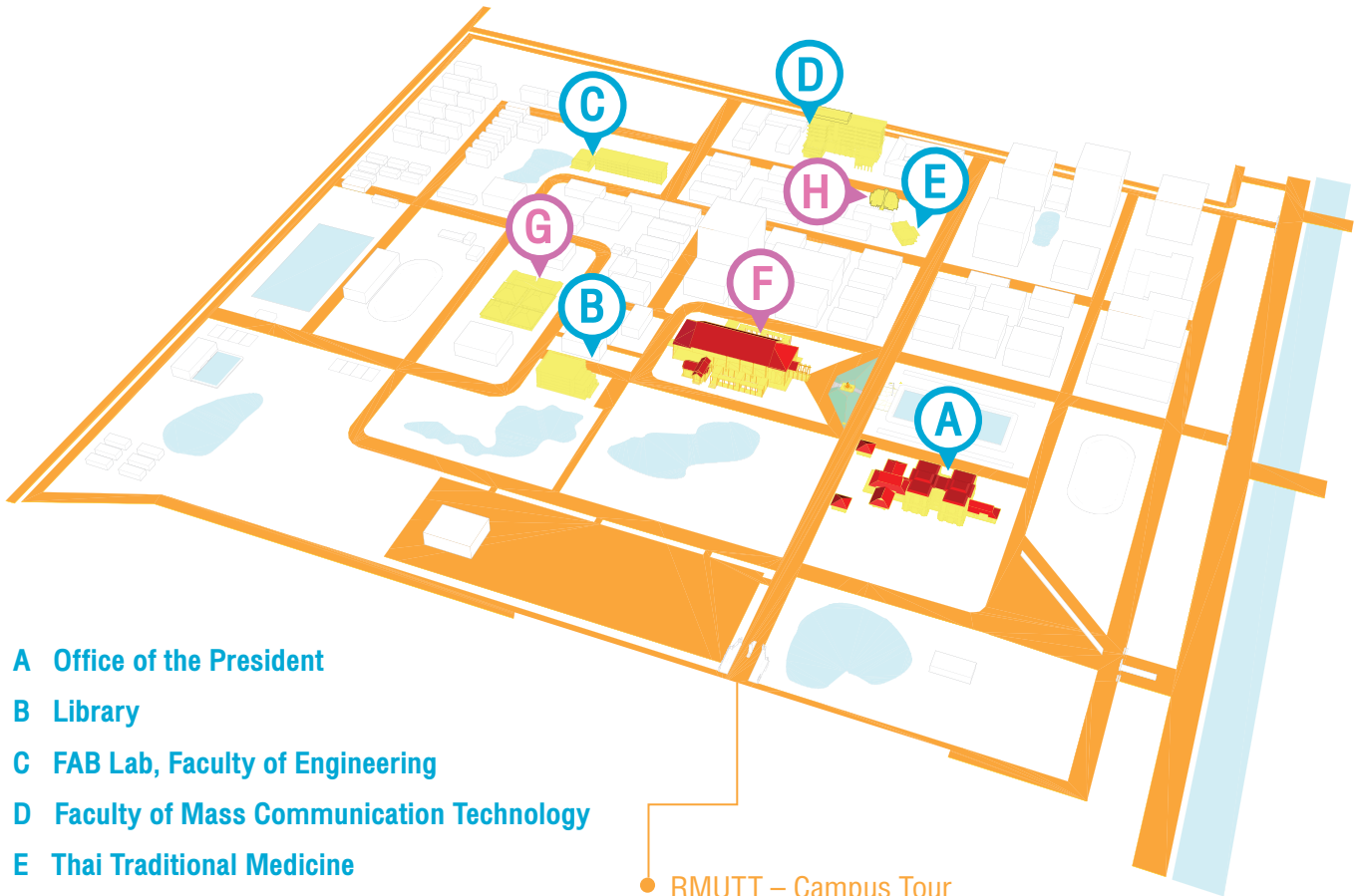
## **Assoc. Prof. Dr. Angkee Sripakagorn**

Engineering Education Initiative, Faculty of Engineering, Chulalongkorn University



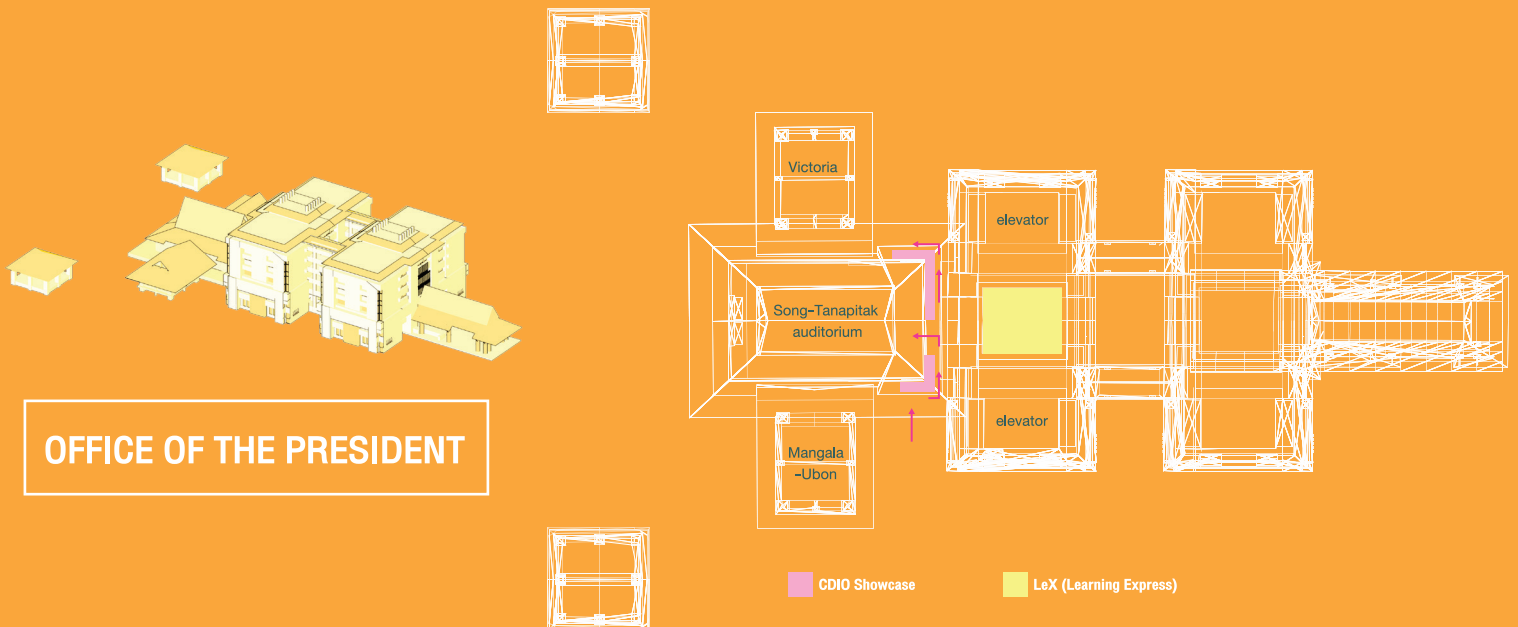
# RMUTT

Location Plan : Rajamangala University of Technology Thanyaburi



- A Office of the President
- B Library
- C FAB Lab, Faculty of Engineering
- D Faculty of Mass Communication Technology
- E Thai Traditional Medicine
- F RMUTT Auditorium
- G Canteens
- H Rajabongkod Hotel

● RMUTT – Campus Tour  
 Route 1 : Library, FAB Lab, Faculty of Engineering  
 Route 2 : TV & Sound System Experience,  
 Mass Communication Technology Workspace,  
 Thai Massage Experience & Hand Cream Making





# DAY 1

13 March 2017 (Monday)

Venue: Rajamangala University  
of Technology Thanyaburi University

Day 1		13 March 2017 (Monday)	
07:30	Depart from Hotel by RMUTT Bus		
09:00	Arrive RMUTT		
09:00 – 09:15	<i>Opening Ceremony</i>	Welcome Speech President: Associate Professor Dr. Prasert Pinpathomrat	
09:15 – 10:00	<i>Keynote Speaker</i>	“Introduction to the CDIO approach to engineering education– motives, implementation and effects on educational quality” Professor Dr. Johan Malmqvist Dean of Education, Chalmers University of Technology, Sweden	
10:00 – 10:30	Coffee Break		
10:30 – 11:00	<i>Invited Speaker</i>	“What Industry Expect from University Graduates - Future Trend” Dr. Sampan Silapanad Vice President and General Manager Hard Disk Drive Operations, Thailand - Western Digital Corporation	
11:00 - 11:30	<i>Invited Speaker</i>	“The Innovations in Engineering Education at Yeungnam University Hub Center for Engineering Education including Design Thinking Education” Professor Dr. Song Dong Joo Senior Vice President Accreditation Board for Engineering Education of Korea (ABEEK) Director, Hub Center of Engineering Education, Yeungnam University, Korea	
11:30 – 12:00	<i>Invited Speaker</i>	“Engineering Education in the Digital Age with an Invitation to the 2017 International CDIO Conference” Dr. Ron J Hugo, P.Eng. Associate Dean (Teaching & Learning) University of Calgary, Canada	
12:05 – 12:15	Photo Ops Session		
12:15 – 13:30	Lunch: Victoria Room		

13:30 – 13:50	<i>Sharing CDIO Experiences</i>	<b>“CDIO – What’s Next?”</b>	
		Dr. Linda Lee Principal Consultant – Singapore Polytechnic International	
13:50 – 14:10		<b>“CDIO Thailand – The Way Forward”</b>	
		Associate Professor Dr. Natha Kuptasthien, RMUTT Associate Professor Dr. Angkee Sripakagorn, Chulalongkorn University	
14:10 – 14:30		<b>“An Introduction to Engineering Education on the KIT/KTC Campus with an Invitation to the 2018 International CDIO Conference”</b>	
		Professor Dr. Masaaki Shikada Dean of Major Basic Education, and Professor, Civil and Environmental Engineering, Kanazawa Institute of Technology, Japan Assistant Professor Robert W. Songer Global Information Technology, Kanazawa Technical College, Japan	
14:30 – 15:00	Coffee Break		
15:00 – 17:00	<i>Parallel Session</i>	<b>Session 1:</b> Songthanapitak Room <b>“Introduction to CDIO: A Framework for Engineering Education”</b> Ms. Helene Leong Director, Department of Educational Development, Singapore Polytechnic Co-chair of CDIO Asian Region	<b>Session 2: RMUTT – Campus Tour</b> Route 1: Library – Fab Lab – Faculty of Engineering Route 2: Mass Communication Technology – Thai Spa – Hand Cream Making
17:00 – 18:00	Presentation of new CDIO member applicants		
18:00 – 20:00	Banquet at RMUTT Conference Hall		

## Keynote Speaker

### **Professor Dr. Johan Malmqvist**

Dean of Education

Chalmers University of Technology

Co-leader and Co-founder of CDIO Worldwide Initiatives



---

Johan Malmqvist is the Chair Professor in product development, and the Dean of Education at Chalmers University of Technology, Gothenburg, Sweden.

His research addresses product development methodologies and IT support for product development. His current research focuses methods and tools for product data analytics, for product configuration and for personalized medicine.

Another area of interest is engineering education. Malmqvist was one of the co-founders and stills leads the international Conceive-Design-Implement-Operate (CDIO) Initiative. The engineering education model that has been developed by the CDIO Initiative has been adapted by a large number of across the world.

### **Introduction to the CDIO approach to engineering education – motives, implementation and effects on educational quality**

Engineering educators of today face many challenges including to how to bring forward design & innovation, how to embrace new digital engineering and learning tools and how to, in addition to engineering knowledge, also equip graduate with the personal and professional skills needed to become leaders in international settings.

The talk will first introduce the principal elements of CDIO (Conceive-Design-Implement-Operate), an approach to engineering education that relies on the product or system lifecycle as a context for the education. The CDIO model was originally developed at MIT but has since spread across the world.

The talk will then review the implementation of CDIO at Chalmers University of Technology, Gothenburg, Sweden. With the mechanical engineering programme as main example, we will show how key CDIO elements such as design & innovation projects, simulation-based mathematics, student prototyping labs, integrated learning of teamwork and communication, entrepreneurship can be realized.

Finally, the talk will examine the impact of CDIO implementation on educational quality. In particular, it will be shown how the CDIO standards and tools can support quality improvement and assurance aiming at obtaining international and national accreditation.

---



## Invited Speaker

### **Dr. Sampan Silapanad**

Vice President and General Manager  
Hard Disk Drive Operations, Thailand -  
Western Digital Corporation

Dr. Sampan has more than 30 years of experience in Quality Assurance, Reliability and manufacturing of semiconductor and Hard Disk Drive Operations. Currently he is a Co-Chairman, World Association for Cooperative & Work-Integrated Education (WACE) and a Vice Chairman of Thai Association for Cooperative Education. He serves as a board of committee for the Institute for the Promotion of Teaching Science and Technology (IPST). He received the Dr. Jack A. Curry Employer Award for Professional Achievement in CWIE by World Association for Cooperative & Work-Integrated Education (WACE) from WACE 19th World Conference on Cooperative & Work-Integrated Education, Kyoto, Japan and the Leadership Award for Leading Development of Co-Operative Education & International Work-Integrated Learning (WIL) from Southern African Society for Cooperative Education (SASCE), WIL-Africa Conference Program, Johannesburg, South Africa in 2015.

Khun Sampan graduated with a Bachelor of Engineering in Mechanical Engineering - Kasetsart University, Master of Management - Sasin Graduate Institute of Business Administration of Chulalongkorn University and Honorary Doctorate in Industrial Engineering, - Suranaree University of Technology.

### **What Industry Expect from University Graduates - Future Trend**

Industry is the fastest move sector especially in today's era that technology move so fast, industry is the first sector that adopt technology into implementing reality. However, availability of skill manpower is a limitation. As industry is shifting into Industry 4.0 in a very near future, technology will change much more frequent than the past and the desired manpower skills are shifted as well.

Characteristics of the new graduates who is coming into the real sector is shifting now. In term of hard skills, they must be deeply understand the basic fundamental in all the areas because most of the new technology are applied from many fields together. In term of soft skills, they must be able to understand the big picture, critical thinking, decision making, be flexible, open for any changes, life-time learning and could adapt to the new things fast.

As industry is moving fast, the new hired are expected to be ready for working so they must practice and develop those working skills since university time or even earlier.

## Invited Speaker

### Professor Dr. Song Dong Joo

Senior Vice President

Accreditation Board for Engineering Education of Korea (ABEEK)

Director of Yeungnam University Hub Center for Engineering Education



Professor Song has been the Director of Yeungnam University Hub Center for Engineering Education and a director of Innovation Center for Engineering Education for more than 5 years.

Prof. Song has been working in Accreditation Board for Engineering Education of Korea for more than 17 years. He is a senior vice president taking charge of ABEEK operation. His major is mechanical engineering, fluid mechanics, engineering design, engineering education and most recently design thinking. He published numerous research papers in mechanical engineering and also in engineering education. Last year he published 'design thinking' and taught design thinking as university liberal art course, engineering design with design thinking. He has given numerous design thinking lectures and works in Korea since 2013.

### **The Innovations in Engineering Education at Yeungnam University Hub Center for Engineering Education including Design Thinking Education**

Yeungnam University Hub Center for Engineering Education Innovation has been designated by Korea Government and supported since 2012. Participating universities to YU Hub Center are 18 around the countries. The goal of Hub Center is educating 'new fusion technology's innovators with creative confidence'. To fulfill the objectives we have several strategies including improving creative new fusion technology skill, creativity, convergence problem solving capability, building global network, fostering leadership, communication and teamwork skills. Specific programs are as follows: International Design Thinking workshop, Hub Center workshops, Creativity.Convergence Camp with Design Thinking, International Capstone Design Project Camp (building electric vehicles), Engineering Education Festival, Enjoyable Design-Project contest & new-fusion technology training program and global field training program in engineering education and International Capstone Design Project Exchange. We developed design thinking courses including 'design thinking', creative engineering design with design thinking, Capstone Design Projects with design thinking, etc.

We have tried many new ideas to innovate engineering education and transferred to participating universities. Also participating university share their innovative education methods and programs among each other. Thus this Hub Center/Innovation Center for Engineering Education Program has been successful in Korea and have been supported by the government for ten years continuously. The basic concepts of the programs are cooperation through Hub Center and competition among Innovation Centers. By doing so it enhances engineering education innovation significantly.





## Invited Speaker

### **Dr. Ron Hugo**

Associate Dean (Teaching & Learning)  
Department of Mechanical & Manufacturing Engineering  
Schulich School of Engineering  
University of Calgary

---

Ron Hugo is Associate Dean of Teaching and Learning and the Li Ka Shing (Canada) Foundation Chair in Engineering Education Innovation at the Schulich School of Engineering, University of Calgary. His engineering education activities include project-based learning, inquiry-based learning, and the exploration of the ever-changing landscape of higher education as brought upon by the digital revolution. His work with online education includes his Mechanical Engineering YouTube lectures which assist engineering students from around the world. His current research involves thermal-science investigations of pipeline systems.

### **Engineering Education in the Digital Age with an Invitation to the 2017 International CDIO Conference**

The digital revolution has ushered in transformational change that has not been seen since the 1780's when steam-powered rotary engines were first used to drive factory machinery during the first industrial revolution. This second machine age, as proposed by Brynjolfsson and McAfee, is one of content digitization, zero-cost replication, and combinatorial advantage. The ubiquitous and socialized nature of this revolution is such that it has changed the mindset and habits of incoming students in an unparalleled manner. Yet engineering education systems have been slow to react and adapt to these changes. In this talk, it will be argued that by both adapting to and embracing these changes, a new era in engineering education can be realized. Experiments in lecture theatre design, instructor-student activities, and assessment methods will be discussed. The talk will conclude with an examination of how embracing this new era in engineering education will strengthen a wider range of attributes from the CDIO syllabus.

---

## Sharing CDIO Experiences

**Dr. Linda Lee**

Principal Consultant

Singapore Polytechnic International



---

Linda Lee has about 20 years of experience in the education arena and; is currently the Principal Consultant with Singapore Polytechnic International overseeing the implementation of Quality Assurance Framework and the engineering education model, CDIO Framework (Conceive, Design, Implement and Operate).

She was the Deputy Director in the School of Mechanical and Aeronautical Engineering and led the CDIO implementation in that school since 2006. Over the last few years, she has been working with partner universities in Malaysia, Thailand, Vietnam, Indonesia, Philippines and Mongolia on implementing CDIO in their engineering curriculum. She has also conducted CDIO workshops for China, India and Korea delegates and the Institute of Education (ITE) in Singapore.

Linda graduated with a Bachelor of Science Degree in Production Engineering and Management (1st Class Honours) and PhD in Information Technology from Loughborough University in the United Kingdom.

### **CDIO, What's Next?**

Singapore Polytechnic has been working with ASIA partner universities in implementing CDIO program since 2011. At the end of the programme, they were able to redesign their existing curriculum in accordance to CDIO skillsets and interpret the CDIO standards for their local context. Following the basic CDIO programme, the institutions now seek to look broader and deeper at the current goals, visions and pedagogical foundation of CDIO to meet the changing needs of industry and the new generation of students.

The talk discusses the next phase of CDIO implementation and centres on enhancing the curricula with the aim of educating students to become effective and productive professionals in conceiving, designing and implementing innovative ideas and solutions. The former comprises Mapping CDIO Skillsets against the future graduates' attributes required by the rapidly changing industry in meeting future challenges; Enhancing CDIO Skillsets where students from different disciplines work together on multi-disciplinary projects; Innovating CDIO Learning and Space for creative teaching, learning approaches and learning space innovation; and Sustaining CDIO to support and monitor programme execution to facilitate advancement of CDIO.

---



## Sharing CDIO Experiences

### **Associate Professor Dr. Natha Kuptasthien**

Assistant to the President for International Relations and

Director of International Strategy Division

Rajamangala University of Technology Thanyaburi, RMUTT

---

Natha was the former Head of Industrial Engineering Department, Faculty of Engineering, RMUTT and led the full CDIO implementation for industrial engineering program since 2013. Her research areas are productivity improvement, quality management and engineering education. She has been invited to talk about CDIO framework to several Thai universities. She has conducted a number of CDIO introductory workshops for engineering and non-engineering programs, which expanded the CDIO network to 8 RMUTs and universities in Thailand. Natha graduated with a Bachelor of Engineering Degree in Industrial Engineering from Chulalongkorn University, Master of Science and PhD in Engineering Management from University of Missouri-Rolla, USA.

---

## Sharing CDIO Experiences

### **Associate Professor Dr. Angkee Sripakagorn**

Department of Mechanical Engineering, Faculty of Engineering,  
Chulalongkorn University



Angkee Sripakagorn is an Associate Professor of Mechanical Engineering Department, Faculty of Engineering, Chulalongkorn University. His main research areas of interest are alternative energy, energy conversion devices and automotive engineering. Besides the academic research, Angkee cofounded the Engineering Education Initiative, EEi with Associate Professor Kuntinee Maneeratana at the Faculty of Engineering, Chulalongkorn University since 2009. EEi has done a large number of research studies and faculty trainings in engineering education. The collective effort of EEi members led to the formation of the Chula Engineering Education 4.0, the framework to restructure the teaching and learning experience in engineering that is now fully adopted by all departments.

### **CDIO Thailand – The Way Forward**

RMUTT has participated in Conceive, Design, Implement, and Operate (CDIO) Framework for Re-Thinking Engineering Education since 2013. RMUTT has integrated CDIO-based Education into university's strategic plan. Major changes and improvement involve in integrated curriculum development, workspace renovation, teaching and learning methods, faculty member competency enhancement as well as assessment methods. RMUTT has been appointed as CDIO collaborator in the CDIO Worldwide Initiatives since March 2014.

Chula Engineering took the steps of CDIO to, among many moves, create new active learning space and design workspace for students. The active implementation of CDIO framework leads to the formation of the Chula Engineering Education 4.0, the framework to restructure the teaching and learning experience in engineering that is now fully adopted by all undergraduate programs at Chula Engineering since 2014.

The two institutions have formed "CDIO Thailand" as a partnership in collaboration to promote the CDIO implementation in Thailand and their international partners. RMUTT is now the key coordinator to expand CDIO framework to other 8 RMUTs nation-wide.

With the enthusiasm of infusing Social Engagement and Innovation to students, Engineering First course is provided to 1st year engineering student at Chulalongkorn University. RMUTT takes part in Learning Express project with Singapore Polytechnic and held the 1st ASEAN Young Leaders for Social Innovation in 2016.



## Sharing CDIO Experiences

### **Professor Dr. Masaaki Shikada**

Dean of Major Basic Education

Professor, Civil and Environmental Engineering

Kanazawa Institute of Technology

---

Masaaki Shikada received a Bachelor of Science, Masters of Science, and PhD degree from Kanazawa Institute of Technology, in 1976, 1983 and 1990, respectively. He became Registered Surveyor and Senior Professing Engineer Educator in 1998 and 2005. His special field of research is Survey and Geospatial Information. His social contributions include work with the Japan Society of Photogrammetry and Remote Sensing (JSPRS), Japan Association of Surveyors (JAS), Geographic Information Systems Association of Japan, Navigation and Timing of Japan (IPNTJ), and Institute of Electrical and Electronics Engineers Geoscience and Remote Sensing (IEEE GRS). His current research includes an original Japanese navigation satellite, the Quasi-Zenith Satellite (QZS) MICHIBIKI that relates positioning accuracy estimations based on experiments of L-Band Experiment (LEX) signals.

---



## Sharing CDIO Experiences

### **Assistant Professor Robert W. Songer**

Global Information Technology  
Kanazawa Technical College



---

Robert W. Songer has been teaching at Kanazawa Technical College in Japan for 8 years as a teacher of the Computer Science and Information Technology professions. His work contributes to a progressive educational program that seeks to produce global engineers by teaching technical subjects in English for students of English as a second language. Japanese students of ages 15 to 20 master topics in programming and software engineering with the intention of putting their knowledge to work in an international workplace. Robert has been involved with the CDIO Initiative since 2010 when Kanazawa Technical College became the first Japanese school to join, and he is a lead organizer for the 2018 International CDIO Conference in Kanazawa, Japan.

### **An Introduction to Engineering Education on the KIT/KTC Campus with an Invitation to the 2018 International CDIO Conference**

The Kanazawa Institute of Technology (KIT) 4-year university with graduate school and Kanazawa Technical College (KTC) 5-year integrated high school and junior college share a campus in the traditional Japanese city of Kanazawa. Together, the schools offer engineering education from as early as age 15 all the way to Doctorate level. This talk introduces the city of Kanazawa, the faculty of KIT, and its unique engineering design education program called “Project Design”. Additionally, a new vision from the President calls for co-creative education capable of producing innovative design that spans generations, disciplines and cultures. Following that, KTC is introduced as a school that traditionally begins engineering education from the pre-tertiary level while currently embarking on unprecedented educational reform. Through the reform, a new curriculum and campus will create a program that includes a 2-year residential system with full English instruction and mandatory 1-year overseas study aiming to foster leadership values and international perspectives. Finally, the talk will conclude with an invitation to see it all in action at the 14th International CDIO Conference in Kanazawa, Japan.

---



## Tutorial Session

### **Ms. Helene Leong**

Director, Department of Educational Development  
Singapore Polytechnic, Co-chair of CDIO Asian Region

Helene Leong is the Director of the Department of Educational Development at Singapore Polytechnic. Her Department leads the development and implementation of educational initiatives in the institution and is in charge of faculty development. Her current focus is on the use of technology in education, enhancing students' intrinsic motivation, enhancing workplace learning, and teaching and learning strategies for the formation of professional identities. She is also the co-leader for the CDIO Asian region and a member of the CDIO council.

### **Introduction to CDIO: A Framework for Engineering Education**

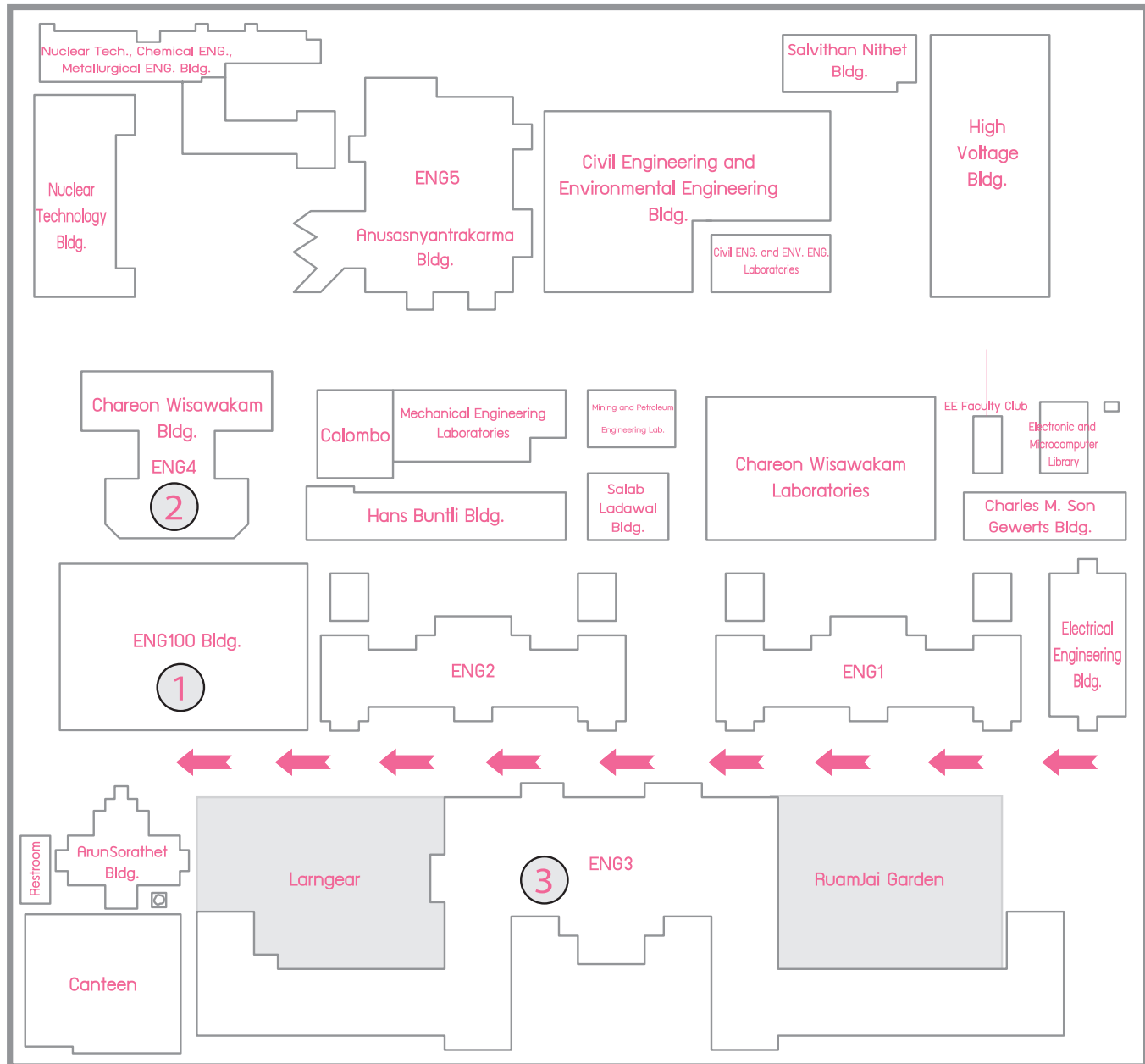
Many engineering programs are faced with 3 key challenges: Firstly, there is the ever increasing body of technical knowledge that graduating students are expected to command; Secondly, the growing recognition that young engineers must possess a wide array of personal, interpersonal, and system building knowledge and skills that will allow them to function in effectively; and Thirdly, the falling interest and motivation of students to study engineering. In order to resolve these challenges, we must review our vision and concept for engineering education.

In this workshop, you will learn about the CDIO strategy to address these challenges. These include:

1. Curriculum reform to ensure that students have opportunities to develop the knowledge, skills and attitudes to conceive and design systems and product
2. Improved level of teaching and learning necessary for deep understanding of technical information and skills and engagement
3. Experiential learning environments to support the students' learning of engineering concepts and practice
4. Effective assessments and evaluation methods to determine quality and improve the learning process.

# CHULA

## Location Plan : Faculty of Engineering, Chulalongkorn University



**1** ENG100 Bldg.  
M Floor : iDW  
4th Floor : iSCALE

**2** ENG4 Bldg.  
2nd Floor : Auditorium

**3** ENG3 Bldg.  
3rd&4th Floor : Library

# DAY 2

14 March 2017 (Tuesday)

Venue: Faculty of Engineering,  
Chulalongkorn University

Day 2		14 March 2017 (Tuesday)	
08:30	Depart from Hotel by Chula vans		
09:00 – 09:15	Welcome Speech President: Professor Dr. Bundit Eua-arporn		
09:15 – 10:00	<i>Keynote Speaker</i>	“Industry Transformation: Challenges and Opportunities for Engineering Education” Mr. Lim Peng Hun Deputy Principal (Engineering), Singapore Polytechnic	
10:00 – 10:30	Coffee Break		
10:30 – 11:15	<i>Invited Speaker</i>	Mr. Kan Trakulhoon Chief Executive Officer and President of the Siam Cement Public Company Limited	
11:15 – 12:00	<i>Invited Speaker</i>	Associate Professor Dr. Xi Wu Department of Electronic Engineering Chengdu University of Information Technology, P.R. China	
12:00 – 13:30	Lunch		
13:30 – 13:50	<i>Sharing CDIO Experiences</i>	“Enhancing Faculty Teaching Competency through Peer Interactions” Mrs. Rangarajan Mahalakshmi Kishore Veltech Dr. RR & Dr. SR University, India	
13:50 – 14:10		“Driving Modern Day Education with myCourseVille” Associate Professor Dr. Atiwong Suchato Vice Dean, Faculty of Engineering, Chulalongkorn University	
14:10 – 14:30		“Automatic Assessment of Students’ Performance and Accreditation Requirements” Vice Provost Bao Nguyen Le Dr. Tan Nhat Tran Duy Tan University, Vietnam Announcement: 2018 CDIO Asian Regional Meeting	
14:30 – 14:45		Closing Remarks	
14:45 – 15:00	Coffee Break		
15:00 – 16:30		Campus Tour iSCALE iDesign Workspace iLibrary	
16:30 – 18:00		Presentation of new CDIO member applicants	
18:00		Depart from Chulalongkorn University to hotel	

## Keynote Speaker

### Mr. Lim Peng Hun

Deputy Principal (Technology & Industry)

Chief Technology Officer of Singapore Polytechnic



Lim Peng Hun is currently the Deputy Principal (Engineering) at the Singapore Polytechnic. He oversees the Engineering Cluster in the Polytechnic. He is active in promoting technology & innovation, applied R&D, entrepreneurship, consultancy, industry partnership and continuing education. He is a strong believer of Innovation in Education. An early adopter and champion of technology enabled learning & green initiatives, he was the team leader of SunSpeed solar car team which participated in the 5th World Solar Car Competition. He proposed and led the adoption of CDIO (Conceive, Design, Implement and Operate) training framework for all Engineering Schools in Singapore Polytechnic. His current interest is in promoting the culture of sustained innovation in Singapore Polytechnic. He spearheads Singapore Polytechnic's latest thrust in developing staff and students' competencies in digital fabrication and innovation mindset for industry 4.0 economy.

### **“Industry Transformation: Challenges and Opportunities for Engineering Education”**

In many countries around the world, and in Singapore, the 4th Industry Transformation, or Industry 4.0, has begun. This industrial transformation is characterised by the convergence of four disruptive technologies: Additive Manufacturing, Robotics, Internet of Things and Big Data Analytics. In this transformation, as with the others, Engineering is key to driving technological innovations.

How can educational institutions respond to the needs of industry as they transform? What factors do educational institutions need to consider and implement to prepare engineering students for the changing industries?

In this session, the presenter will share the challenges faced in transforming the polytechnic's engineering education. He will share an approach educational institutions can adopt and the input they can draw on to better understand the goals and needs of industry and to translate these needs to capability building and curriculum development.

The presenter will share how the integration of Design Thinking and, in particular, Fab Lab skills and activities with CDIO could develop and deepen the technical and innovative skill sets of engineering students. Fab Lab SP began in 2013 and is the result of collaboration among School of Electrical and Electronic Engineering (EEE), and School of Mechanical and Aeronautical Engineering (MAE), it was conceived to allow staff and students to make “almost anything”.

Fab Lab SP is part of the global network of Fab Labs (<http://www.fabfoundation.org/index.html>) which began as an outreach project from MIT's Centre of Bits and Atoms. It currently houses equipment such as 3D printers, laser cutters and 3D CNC Prototype Mill. It provides hands-on training in cutting edge technology and aims to be a place where students from across schools can collaborate on multi-disciplinary projects. A driving force behind the Fab Lab is the notion of “Makers Culture” – a concept which encourages creative learning through doing and nurtures intrinsic motivation for self-learning.





## Invited Speaker

### **Mr. Kan Trakulhoon**

Director and Chairman of Managing Advisory Committee  
Siam Cement Public Company Limited

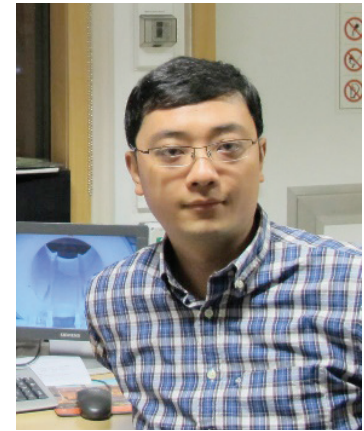
Kan Trakulhoon is the Director and the Chairman of the Management Advisory Committee of Siam Cement Group (SCG). He retired from President and CEO of SCG in January 2016. Kan had been actively involved with the government sectors in the drive to reform and restore Thailand's economic stability ever since. Kan heads two Public-Private Partnership Committees initiated by the Royal Thai Government, namely the Innovation and Productivity Committee and Legal Reform Committee along with the Eastern Economic Corridor (EEC) project. Kan was previously an outside Director of Kubota Corporation and is now Global Advisor to Kubota Corporation and Member of the Advisory Board of Nomura Holdings, Inc. both of which are headquartered in Japan. Moreover, Kan is Chairman of the Board of Directors of Advanced Info Service Public Co., Ltd. and Independent Director of Siam Commercial Bank Public Co., Ltd.

### **Next Generation of Engineers and the Creation of Innovative Organization**

The three main components for developing innovative goods comprised of the innovation in products, process and business.

The education are timeless. I have taught much during the past ten years and learnt together with the students. It is necessary to be well informed and gain new knowledge. When I traveled, I spent the time reading to gain new and diverse information. It is necessary to be humble and be unrelenting in the thirst for knowledge. By nature, a generation Y person has high thinking ability. However, it is more important to manage and catalogue the ideas and thoughts. Both generation Y and Z people have lots of ideas and are quick learners due to new technology. However, generation Z people are more extreme in certain aspects; they are more IT literate, dislike to be constrained and have high confidence. These are people who will be the main driving force in the future.

Invited Speaker  
**Professor Dr. Xi Wu**  
Department of Electronic Engineering  
Chengdu University of Information Technology



---

Dr. Xi Wu is a Professor and the Deputy Dean of Department of Computer Science, Chengdu University of Information Technology, and he is also the director of Collaborative Innovation Center for Image and Geospatial Information of Sichuan Province, P.R. China.

Dr. Wu's main research area is the development of novel methods for analysis of imaging data. He has been also involved in cognitive studies cooperated with Computational intelligence since 2008 when he joined the Sichuan University and Institute of Imaging Science, Vanderbilt University for Ph.D. study. In 2012, Dr. Wu was with Oxford Centre for Functional MRI of the Brain, University of Oxford as a postdoctoral researcher.

### **The Implementation of CDIO in Chengdu University of Information Technology: A Systematic View from University**

Chengdu University of Information Technology (CUIT) has implemented CDIO for the whole university in all 53 disciplines for nearly 10 years. The presenter will first give a small description of why and how the university decided to implement CDIO 10 years ago. Then the whole framework of the implementation of CDIO in CUIT will be introduced and followed with the achievements. The challenge and points should be pay more attention were also mentioned.

---



## Invited Speaker

### **Mrs. Rangarajan Mahalakshmi Kishore**

Chairperson Managing Trustee  
Veltech Dr.RR & Dr.SR University

Mrs. Mahalakshmi is a renowned institutional builder in south India. She is a key stakeholder in several schools and institutions offering Engineering, Technology, Management and Science education under Veltech group. She obtained her Bachelors in Engineering in Industrial Engineering from Anna University, Chennai, with Distinction and Masters of Business administration with specialization in Finance from UK. She is instrumental in bringing educational reforms such as Outcomes Based Education at school and university level, assessment and evaluation reforms and faculty capacity enhancement initiatives. She serves in the Governing Board of several educational institutions as chair/members. She participates as representative of educational philanthropists in many government committees. She visited Sweden as a member of the President of India delegation.

### **Enhancing Faculty Teaching Competency through Peer Interactions**

The technological advancements, happened during recent decades in all the sphere of our life, created a big cultural change among the student community including their learning styles and attitudes. Though abundant of learning materials are available now-a-days in the world-wide websites in various forms such as animation, video lectures and text materials, teacher role is inevitable role in the students' learning process. Having realized cultural, socio-economic and technological developments, a systematic, university-wide approach has been modelled last year to creating an encompassing movement towards enhancing the faculty teaching skills to fit themselves for Y-Gen students of 21st Century. Veltech founded a new faculty learning forum "Teaching Developers Initiative (TDI)" wherein a select faculty group will meet every Friday and explore and interact their innovative teaching methods attempted in their classrooms. Active learning methods such as Experiential, Collaborative, Problem-based, Project-based learning, Jigsaw, Think-Pair-Share, Gallery walk and Fish bowl are some of the novel teaching methods employed by the faculty members in their classrooms. The outcomes of the active learning implementation are well evidenced by the students' learning.

**Invited Speaker**  
**Associate Professor Dr. Atiwong Suchato**  
Vice Dean  
Faculty of Engineering, Chulalongkorn University



Dr. Atiwong Suchato is currently the Associate Dean overseeing the education strategy of Chula Engineering. Graduated from Massachusetts Institute of Technology in 2004, Dr. Atiwong Suchato has been teaching in the Department of Computer Engineering for more than 10 years. During those years, he has always been passionate about effective teaching techniques and tools that enrich the learning of new generations of Thai engineers. Originally trained in the field of Speech Recognition, Dr. Atiwong Suchato applied human-centric principles to Engineering Education as well as the development of related Education technologies. His key contribution in recent years was the development of a Learning Management System named “myCourseVille” which has been operational at Chulalongkorn University for more than three academic years and has been designated as a key element of the university’s future Education Technology ecosystem.

Currently, he and his team are actively driving the implementation of a CDIO-inspired education framework at Chula Engineering.

### **Driving Modern Day Education with myCourseVille**

In this talk, the speaker introduces a home-grown Learning Management System (LMS) called “myCourseVille”, which was originally developed as an endeavor to connect learner’s learning activities to their social network lifestyle. Gaining popularity among a group of instructors, Chulalongkorn University, aiming to raise its instructors’ LMS adoption rate, funded the continuing development of the LMS in order for “myCourseVille” to be a realistic alternative to the other commercially available LMS package that the university has been paying for the services for more than a decade. Not only that “myCourseVille” met the initial objective but various extensions were also consequently developed to support some of the university’s strategic moves including: Tools for Active Learning implementation, Platform for Learning Analytics researches, and Online-course distribution platform. Faculty of Engineering deployed the system to support the management of the integrated curriculum standard in the faculty’s CDIO implementation as well as its program accreditation process. Today, “myCourseVille” serves as a success case where an in-house LMS development has been nurtured into a functioning education platform service made available to a number of schools and institutes in Thailand.



## Invited Speaker

**Dr. Bao N Le**

Vice Provost

Duy Tan University

---

Dr. Bao Le is the Vice Provost of Duy Tan University (DTU), in charge of the Technology & Engineering Division. He has brought about the adoption of CDIO at DTU since 2011, and has helped sustain the university-wide CDIO effort until now. His specialty is in data warehousing, 3D animation, and online marketing. He holds doctorate degrees in both Business Administration and Computer Science.

---





## Invited Speaker

### **Dr. Tan N Tran**

Director of the Quality Assurance Center

Duy Tan University



---

Dr. Tan Tran is the Director of the Quality Assurance Center at Duy Tan University. He has helped with the deployment of CDIO and PBL at Duy Tan University during the last four years. He also has great experience mentoring students who participates in the CDIO Academy and other international tournaments, mostly notably the CDIO Cup for DTU in 2013. He holds his doctorate degree in Environmental Engineering.

### **Automatic Assessment of Students' Performance and Accreditation Requirements**

Assessment of students' performance and program accreditation requirements is not an easy job given the time-consuming nature and heavy load of data documentation, data cleansing and data integration from various sources and levels of assessment. Being the quality-assurance basis for many engineering programs around the world, the CDIO Framework with its many syllabus levels has been very helpful in guiding schools and educators around the world through different stages of assessment to arrive at relatively accurate assessment results. Usually, the higher the CDIO syllabus level one program may adopt, the more accurate its assessments become. However, it is always very difficult to ensure the data integrity and validity for decision making at the high levels of the CDIO syllabus, for instance at its 4th-level syllabus. At Duy Tan University (DTU), an automatic assessment system built on top of its Learning Management System (LMS), which helps assess the requirements of the CDIO syllabus up to its 4th level, has recently brought about a great leap in the amount of time and effort required to assess students' performance as well as to measure ABET, AUN, KAAB accreditation requirements. It, however, also brings about a great number of issues that needs to be discussed in terms of decision making procedures, assessment benchmarks, cross-division data difference, etc. Our presentation, as a result, will showcase our efforts and experiences for automatic performance assessment with the hope of encouraging further discussion amongst the audience about the future of performance assessment in our engineering community using the CDIO Framework.

---

# DAY 3

15 March 2017 (Wednesday)

Venue: Faculty of Engineering  
Chulalongkorn University

Day 3	15 March 2017 (Wednesday)
8:00	Depart from Hotel by Chula vans
8:30 – 11:30	CDIO Member Meeting  Presentation of New Applicants  Case Study and Discussion  Facilitated by Ms. Helene Leong  Depart from Chulalongkorn University to hotel

## Transportation

Please be ready at the pickup area five minutes early.

Monday 13 March 2017	Departure time 7:30 Mandarin Hotel to RMUTT	Departure time 20:00 RMUTT to Mandarin Hotel
Tuesday 14 March 2017	Departure time 8:00 Mandarin Hotel to Chula	Departure time 18:00 Chula to Mandarin Hotel
Wednesday 15 March 2017	Departure time 8:00 Mandarin Hotel to Chula	Departure time 11:30 Chula to Mandarin Hotel

# CDIO

The CDIO™ INITIATIVE is an innovative educational framework for producing the next generation of engineers. The framework provides students with an education stressing engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating (CDIO) real-world systems and products. Throughout the world, CDIO Initiative collaborators have adopted CDIO as the framework of their curricular planning and outcome-based assessment. CDIO collaborators recognize that an engineering education is acquired over a long period and in a variety of institutions, and that educators in all parts of this spectrum can learn from practice elsewhere. *The CDIO network therefore welcomes members in a diverse range of institutions ranging from research-led internationally acclaimed universities to local colleges dedicated to providing students with their initial grounding in engineering.*

Engineering education and real-world demands on engineers have in recent years drifted apart. Realizing that this widening gap must be closed, leading engineering schools in the USA, Europe, Canada, UK, Africa, Asia, and New Zealand formed the CDIO Initiative: A worldwide collaborative to conceive and develop a new vision of engineering education.

CDIO is based on a commonly shared premise that engineering graduates should be able to: Conceive – Design — Implement — Operate complex value-added engineering systems in a modern team-based engineering environment to create systems and products.

## **Vision of the CDIO-based education**

An education that stresses the fundamentals, set in the context of Conceiving – Designing – Implementing – Operating systems and products:

- A curriculum organised around mutually supporting courses, but with CDIO activities highly interwoven
- Rich with student design-build-test projects
- Integrating learning of professional skills such as teamwork and communication
- Featuring active and experiential learning
- Constantly improved through quality assurance process with higher aims than accreditation

Several times each year the CDIO member institutions from around the world gather to exchange ideas and experiences, review developments at each school, assess the Initiative's progress, and further refine the project.

The CDIO Annual International Conference is the largest meeting of the year, and includes presentation of papers and other special seminars, workshops, events, and activities. Other schools and their individuals interested in CDIO are welcome and encouraged to attend.

At each meeting, the agenda features introductory and advanced workshops for new and experienced CDIO Collaborators. At the former, our newest collaborators get valuable startup guidance from other collaborators; at the latter, experienced collaborators can learn how to take their existing CDIO program(s) to the next level.

The meetings offer plentiful opportunities to learn about CDIO, to discuss its implementation in new locations, and to network and exchange ideas with other regional collaborators.

# MEMO

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

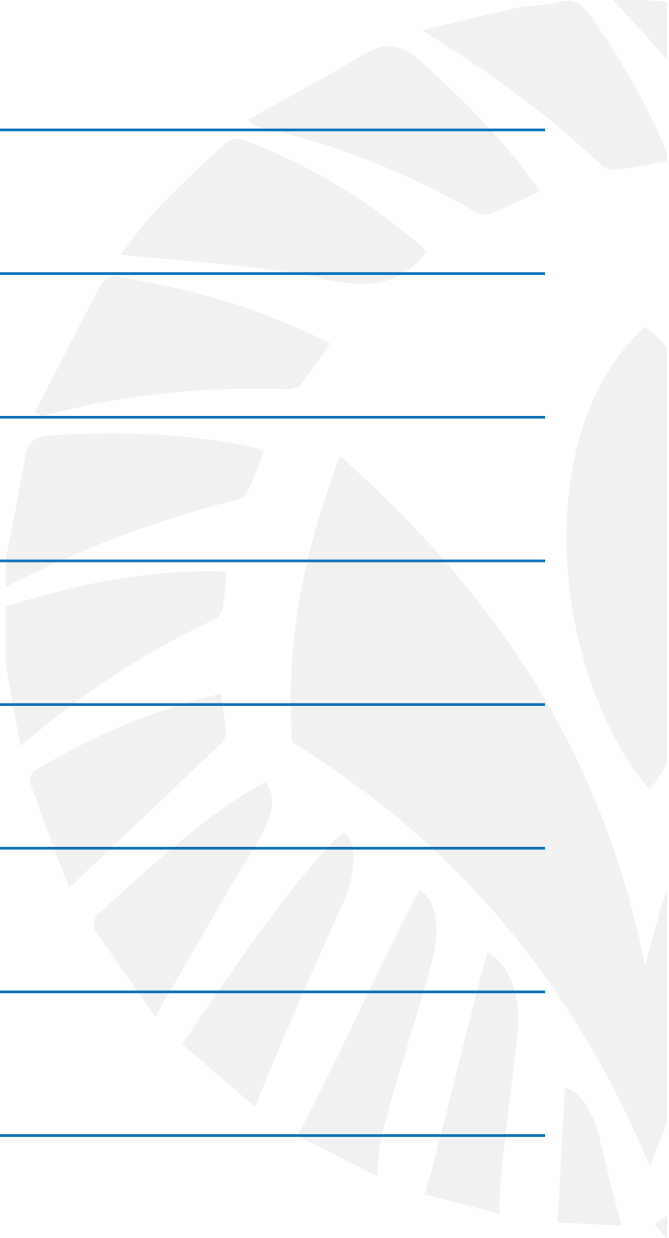
---

---

---

---

---



# MEMO

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



# MEMO

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---





# 2017 CDIO Asian Regional Meeting

## Sponsor

---



# 2017 CDIO Asian Regional Meeting

---

Rajamangala University of Technology Thanyaburi, RMUTT

Faculty of Engineering, Chulalongkorn University

THAILAND