Asian Control Association
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Newsletter

Vol. 7, No.1, Nov. 2016

Message from the president

It is a great pleasure, as I commence my term as ACA President, to note all the great work that have been previously done; so that ACA is now poised to make even more contributions ahead.

The recent ASCC 2015 Kota Kinabalu conference was extremely successful; and we certainly look forward to the upcoming ASCC 2017 Gold Coast conference, and the already-in-the-works ASCC 2019 Kita-Kyushu conference.

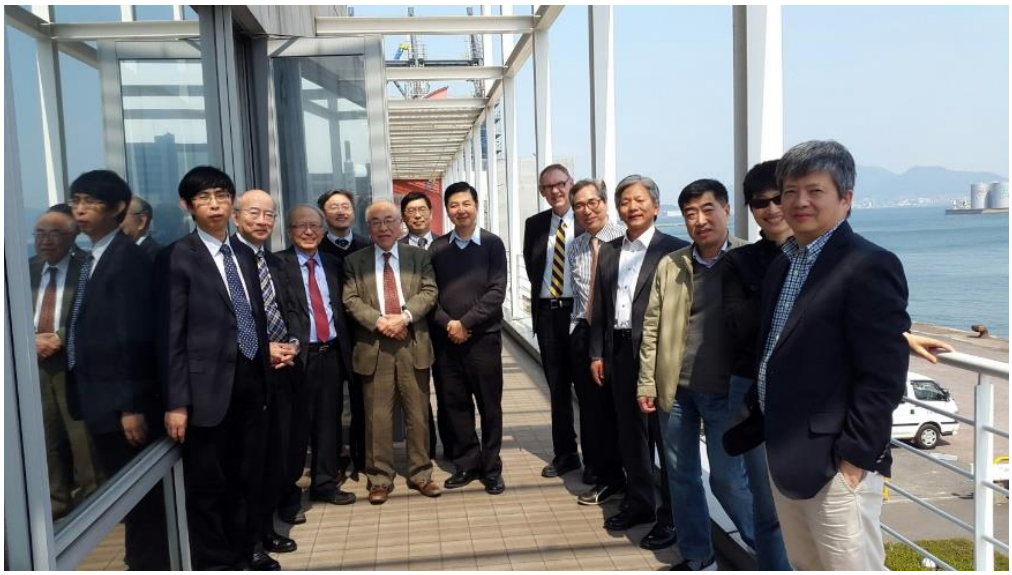
In our endeavour to further push ahead our Membership efforts (particularly from among the future generations), I am very happy to announce the additional (i.e. additional to all existing ACA Awards) implementation of an ACA Temasek Young Educator Award. Application to the award is open to any young person of age forty years and below; and the young person should already be an ACA Member at the time of application. The award seeks to recognize outstanding education efforts in Control Systems Engineering from amongst the younger generation, and it also serves as an impetus to encourage more young persons to identify with us as ACA Members. Up to two ACA Temasek Young Educator Awards will be presented every ASCC year, with each Award valued at US$500. There will be an upcoming Call for Application soon for the award jointly by the VP(Education) and VP(Membership). An independent committee of eminent ACA persons will make the decision from the received applications.

We certainly look forward to new contributions ahead as ACA progresses and becomes even more established.

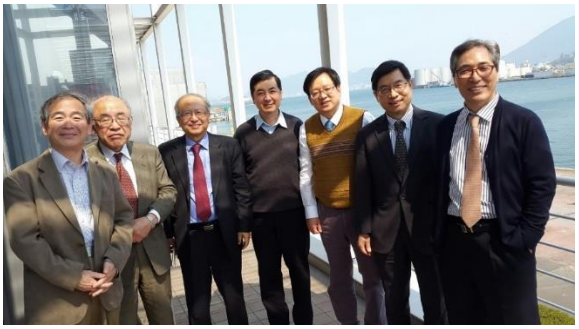
T. H. Lee,
President of ACA

Introducing the new ACA Executive Board

At the recent ACA Steering Committee Meeting (in Kita-Kyushu, 27-29 March 2016) excellently organized by Professor Takeshi Mizuno (then VP Membership) and Professor Yasuchika Mori (SC member), the new ACA Executive Board began to assume its duties.
Then ACA President Professor Sangchul Won very capably completed his term, and President-Elect Professor Tong Heng Lee succeeded him.
In line with this, at the Steering Committee Meeting, Professor Takeshi Mizuno was elected as the new President-Elect.
For the Vice-Presidencies --- VPs Professor Shaoyuan Li (Education), Professor Ian Petersen (Technical Activities) and Professor Kai-Tai Song (Publications) continue into their respective terms and portfolios; and Professor Keum-Shik Hong was elected as the new VP (Membership).
We look forward to further excellent developments ahead, noting already the extremely successful recent ASCC 2015 Kota Kinabalu conference; the upcoming ASCC 2017 Gold Coast conference; and the already-in-the-works ASCC 2019 Kita-Kyushu conference.
Postscript: Following on from discussions after the SC Meeting, we also welcome Professor Boogyeon Park as the new ACA General Secretary. He succeeds Professor Seul Jung who had served admirably and completed a full three-terms.



- From left: Shaoyuan Li, Takeshi Mizuno, Wook Hyun Kwon, Tong Heng Lee, Hidenori Kimura, Kai-Tai Song, Li-Chen Fu, Ian Peterson, Sangchul Won, Yasuchika Mori, Wang Wei, Ying Tan, Li Qiu



- From left: Hyungsuck Cho, Hidenori Kimura, Wook Hyun Kwon, Li-Chen Fu, Keum-Shik Hong, Kai-Tai Song, Sangchul Won

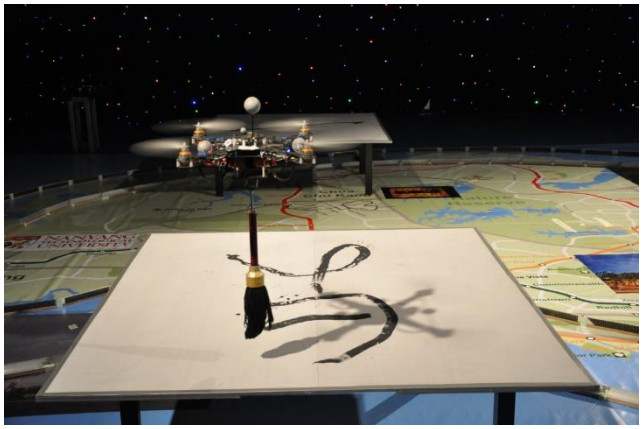
The NUS ECE UAV Team

In recent years, research and development of unmanned systems have gained much attention in the academic and military communities worldwide. Topics like unmanned aircraft, underwater explorers, satellites, and intelligent robotics are widely investigated as they have potential applications in the military and civilian domains. An unmanned aerial vehicle (UAV) is an aircraft that is equipped with necessary data processing units, sensors, automatic control, and communications systems and is capable of performing autonomous flight missions without the interference of a human pilot. It is observed that autonomous aerial vehicles are about to play major roles in tasks like reconnaissance for search and rescue, environment monitoring, security surveillance. Their mobility and sensing capabilities make them an ideal platform for exploration and monitoring tasks. The challenge is that they need to deal with various situations that arise in very complicated and uncertain environments, such as unexpected obstacles, enemies attacking and device failures. Consideration of a wide range of factors needs to be taken. Control systems for the unmanned vehicles are required to integrate not only basic input-output control laws but also high-level functionalities for decision making and task scheduling. Software systems for unmanned vehicles are required to perform tasks from hardware driving to the management of device operations, and from traditional input-output control law implementation to task scheduling and event management.

The UAV Research Team in the Department of Electrical and Computer Engineering, National University of Singapore, has been working on various research projects related to defense technologies since 2003. The main focus is on unmanned rotorcraft systems and other vertical take-off and landing (VTOL) vehicles, and to explore the potentials of the next generation intelligent UAVs in various applications. Extensive research efforts are dedicated to cope with such challenges, in which a board range of disciplines are involved, including control theory, communications, aerodynamics, navigation, computer vision, multi-agent systems, hybrid systems and artificial intelligence. The team has successfully constructed a family of unmanned helicopters with payloads ranging from few hundreds of grams to over ten kilograms, and developed indoor navigation systems, which enable drones to safely navigate through the unknown and complicated indoor environment and complete autonomously necessary flight missions. Progress has also been made on the development of unconventional hybrid UAVs.

The NUS UAV team is often called upon to serve the needs of the nation, and has received formal recognitions from MINDEF and DSO for their technical contributions. The team is recognized as one of the top UAV groups in the world. It has consistently won top prizes in international competitions.

➢ HeLion—the first unmanned rotorcraft constructed at NUS

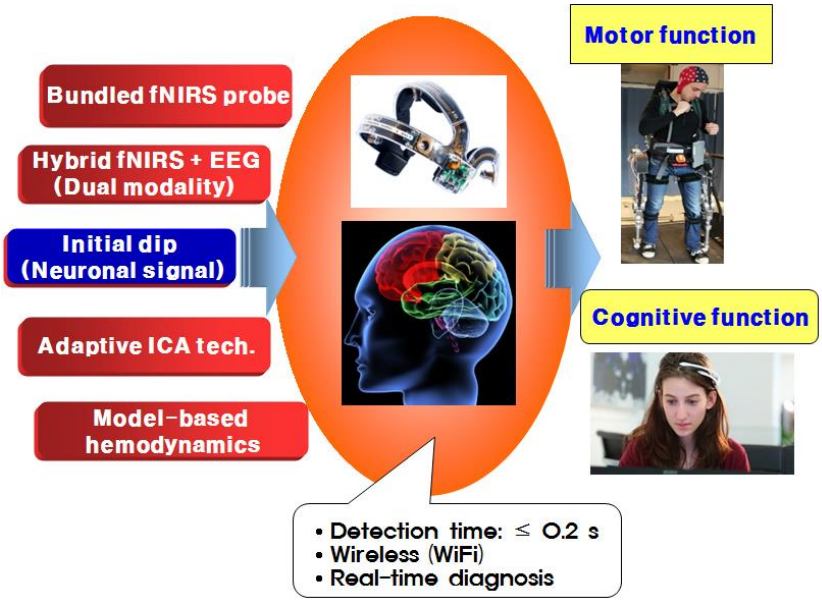


➢ UAV Calligraphy

Cogno-Mechatronics Lab (Keum-Shik Hong, 洪金植)

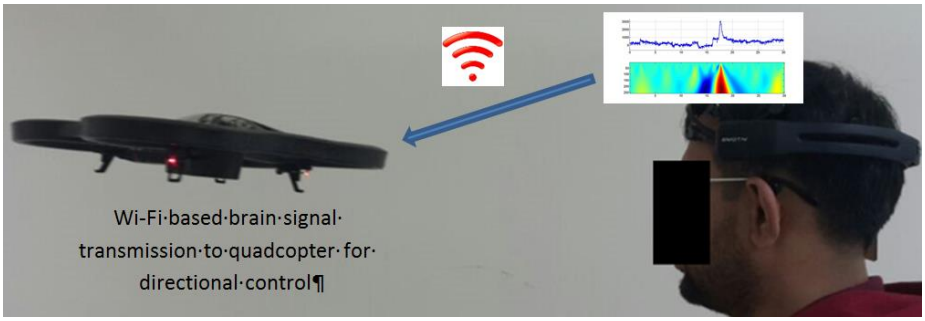
The Cogno-Mechatronics Laboratory led by Professor Keum-Shik Hong, School of Mechanical Engineering, Pusan National University (PNU), Korea, has been working on various research areas related to brain engineering, control, and robotics systems. Extensive efforts in research are being put to cope with challenges, in which a board range of disciplines are involved, including brain imaging, brain-machine interface, control theory, vibration control, and robotics.

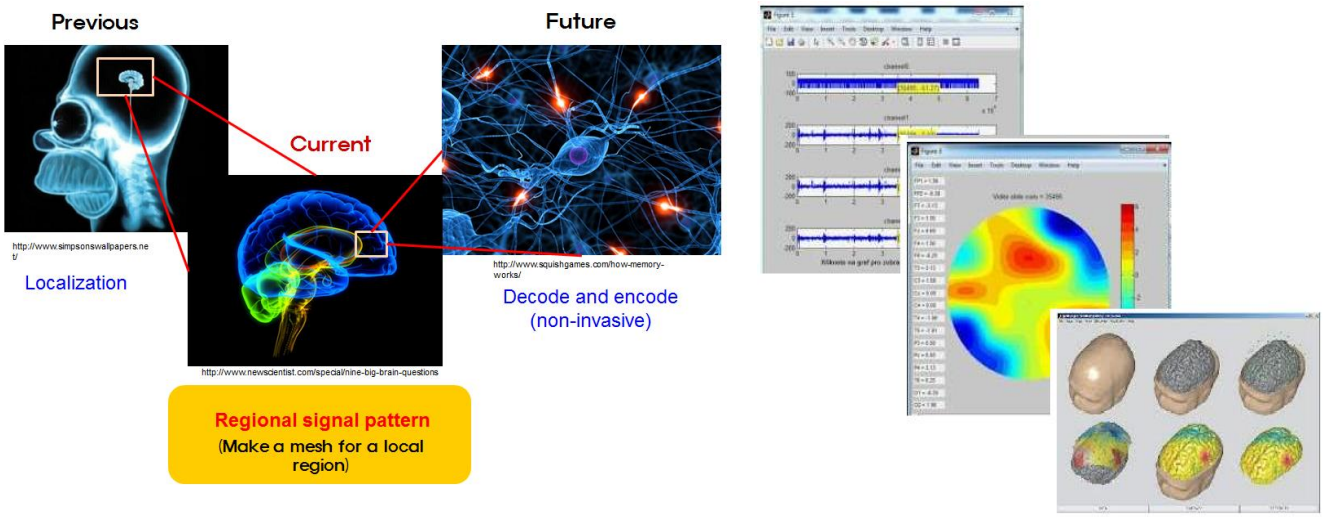
The brain engineering team is working on the development of real-time diagnostic system for motor and cognitive function recovery. Hardware is being developed for real-time multi-modality imaging system to achieve the objectives. The hardware consists of LED-based wireless-fNIRS system with multiple wavelengths to observe changes in hemodynamic responses. The multi-modality imaging is being done by combining the wireless fNIRS system with EEG. Along with brain imaging, research is also being carried out on hybrid EEG-fNIRS based brain-computer interface (BCI) for communication and control. The focus of this research is the reduction of inherent time delay between the two modalities for BCI applications. Moreover, the hybrid system is being used to control a quadcopter in real-time with enhanced accuracy and increase number of control commands. Also, BCI research on the detection and classification of initial dips is being carried out to for the early detection of fNIRS signals. In order to remove noise in fNIRS signals, the research team is developing different adaptive noise removal techniques (e.g., adaptive-ICA etc.). To improve the spatial resolution of fNIRS system, bundled-optode method is developed using continues-wave fNIRS system. The method is applied for the reconstruction of the 3D brain images using fNIRS.



Toward a mobile real-time brain imager

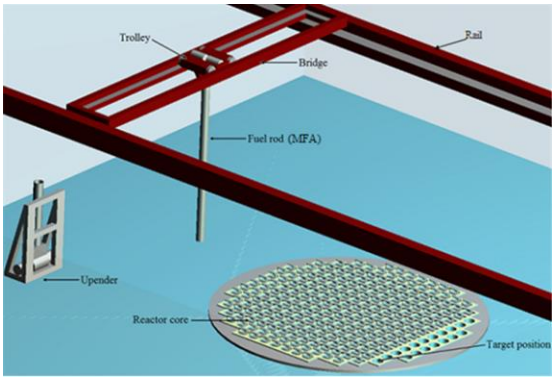
➢ Brain-controlled drone





➢ Brain engineering: 3-D brain images using bundled optodes scheme

In vibration control area, the main research focus is the development of mathematical models and control schemes for suppression of vibrations experienced by the nuclear fuel rods during a refueling process in the reactor. A refueling machine (i.e., an overhead crane) is required to transport the master fuel assembly (MFA) from given locations (i.e., reactor core) to the target position (i.e., the fuel upender) and vice versa in quick time. The transportation of the MFA takes place in water to prevent transference of the radiation to the environment. However, quick maneuvering of the MFA in water can generate hydrodynamic force causing large deflections that can damage the fissile material within. For such problem, the lab is working on developing mathematical model. In these models, the refueling machine is considered as a hybrid system consisting of a lumped-mass trolley system and a flexible MFA system that exhibits transverse displacement in water. Furthermore, a new input-shaping control law that satisfies the maximum deflection constraint during transference and effects the minimal residual MFA vibration at the target position in a nuclear reactor have been developed.



➢ Model of nuclear fuel rod transportation system

Other research subjects during the past 23 years

ASCC 2017 Homepage : http://www.ascc2017.com

Call For Papers

ASCC 2017
Asian Control Conference

17 – 20 December 2017, Gold Coast, Australia
www.ascc2017.com

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Hidenori Kimura, Japan
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Raissa Uskenbayeva, Kazakhstan
Riyanto Trilaksono, Indonesia
Rubiyah. Yusof, Malaysia
Seul Jung, South Korea
Shaoyuan Li, China
Takeshi Mizuno, Japan
Tong Heng Lee, Singapore
Wei Wang, China
Yanlong Zhao, China
Yasuchika Mori, Japan

The 2017 Asian Control Conference – ASCC 2017 will be held on 17 – 20 December 2017 in the City of Gold Coast, Australia.

The ASCC conference series is organised by the Asian Control Association and it has been recognised as a premier scientific event of the Asia-Pacific region aimed at advancing control systems theory and practice. It hosts control systems scientists, researchers, students and practitioners in exchanging their ideas and recent results.
The inaugural conference of the ASCC series was hosted by Tokyo Metropolitan Institute of Technology in 1994 and then followed by conferences in Seoul (1997), Shanghai (2000), Singapore (2002), Melbourne (2004), Bali (2006), Hong Kong (2009), Kaohsiung (2011) Istanbul (2013) and Kota Kinabalu (2015).

The ASCC 2017 will feature plenary, semi-plenary, contributed and invited paper sessions and will be proceeded by technical workshops and/or tutorials. The ASCC 2017 Proceedings will be included in IEEE Xplore. The ASCC 2017 will present: (i) Shimemura Young Author Prize, (ii) Best Paper Award and (iii) Best Application Paper Award.

A broad in its scope, the ASCC 2017 Program addresses a spectrum of theoretical topics and a range of applications from industrial automation, robotics and mechatronics to process industries, manufacturing, transport, biology, medical and financial systems, cyber security, communication, education and social impact studies, etc.
Important Submission Deadlines:

Regular Papers (drafts)	10 July 2017
Invited Session Proposals	10 July 2017
Workshop Proposals	10 July 2017
Author notification	22 September 2017
Invited Session & Workshop Notifications	22 September 2017
Early Registration	22 September 2017
Final Papers	01 October 2017
Workshops & Tutorials	17 December 2017
Conference	18–20 December 2017

Technical Co-sponsorship:

The 12th Asian Control Conference (ASCC 2019)

Early in June, 2019

Kitakyushu International Conference Center
Kitakyushu, Fukuoka, Japan

Invitation to Kitakyushu, Japan, a quarter-century after the 1st ASCC

ASCC is the international conference held in Asia contributing to the progress of control science and technology not only of Asia but also of the world. It started in 1994 with the first hosted by Tokyo Metropolitan Institute of Technology. The second ASCC was held in 1997 in Seoul, Korea and subsequently in Shanghai (2000), Singapore (2002), Melbourne (2004), Bali (2006), Hong Kong (2009), Taiwan (2001), Istanbul (2013), Kota Kinabaru (2015) and will be held in Gold Cost (2017). In 2019, just a quarter-century after the 1st ASCC, it will come back to Japan.

ASCC 2019 will be held in June, 2019 at Kitakyushu International Conference Center in Kitakyusyu, Fukuoka, Japan. Kitakyushu-cty is very attractive in various apects - high-tech industries, cultural activities, sightseeing resources and delicious couisines. The convention center also prepares excellent conventional facilities and activities. It is within 10-minute walk from JR (Japan Railway) Kokura Station.

All inquiries and proposals concerning the conference should be addressed to:

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URL: http://www.ascc2019.org

City of Kitakyusyu (Night view from Mt. Sarakura)

ACA Homepage : http://www.acacontrol.org