Greetings from the Dean

A very happy new year and I hope you had an enjoyable break over the Christmas period. 2016 had been a good year for the College, we had a lot to celebrate.

Our faculty members continue to bring honour to the College with their myriad achievements and accolades.

To name a few:
• Five faculty members were newly elected as IEEE fellows in 2017, the highest number ever achieved by the College. They are Prof Su Guaning, Prof Chau Lap-Pui, Prof Dusit Niyato, Prof Josep Pou and Prof Shen Zhongxiang. This boost in numbers is a result of the "IEEE Fellow Workshop" jointly hosted by EEE and SCSE. We will extend the ideas to other schools and other society fellows.
• Prof Wang Rong and Prof Anthony G. Fane for being the first from Singapore to be awarded the prestigious Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW).

We were also successful in recruiting faculty members who are recognised leaders in their respective fields. In one year, the College recruited thirty-three full-time faculty members comprising 3 Full Professors, 2 Associate Professors, 2 Nanyang Assistant Professors, 21 Assistant Professors and 5 Lecturers. To add to the faculty strength, the College also appointed twenty-five new Visiting Professors from various overseas tertiary institutions and 10 new Adjunct faculty members from research institutions and private companies. Such additions are vital in terms of improving the quality and vibrancy of the faculty population. With our strong pool of faculty members, we are able to compete with top universities around the world in attracting talent.
Greetings from the Dean (Cont’d)

The College has also improved its standing in various international ranking tables. In the recent Academic Ranking of World Universities 2016 released by ShanghaiRanking Consultancy, the College was ranked 2nd in the world (just behind MIT) and 1st in Asia for Engineering/Technology and Computer Sciences.

Many new partnerships and collaborations with key industry players were formed, affirming NTU CoE’s standing as a globally recognised leader in engineering and innovation. Last year, we launched two new corporate laboratories that gained much media interests:

- The $60 million **SMRT-NTU Smart Urban Rail Corporate Laboratory** – a collaboration between SMRT and NTU’s EEE and MAE to develop technology-driven solutions to build a more resilient and reliable urban rail system.
- The $45 million **Delta-NTU Corporate Laboratory for Cyber-Physical Systems** – a collaboration between Delta Electronics and NTU’s EEE, MAE and SCSE to develop smart technologies that will enhance everyday lives, enable better learning and advance manufacturing processes.

We had also set up two research centres, the **Data Science and Artificial Intelligence Research Centre (DSAIR)** and the **Centre for Smart Platform Infrastructure Research on Integrative Technology (SPIRIT Centre)**, in alignment to the Government’s strive to be a Smart Nation.

In undergraduate education, the College also surpassed the success of 2015, with the College attracting a total of 218 T15 students. We launched two new Second Majors:

- The **Second Major in Medical Biology** is jointly offered with the College of Science and aims to impart Materials Engineering students with the knowledge and skills to tackle emerging healthcare developments such as regenerative medicine.
- The **Second Major in Pharmaceutical Engineering** allows students in Materials Engineering or Bioengineering to acquire specialised knowledge on drug design and development.

The **Second Major in Food Science and Technology** was also extended to students reading Bioengineering.

I would like to commend our Schools and colleagues for their passion, dedication and hard work, without which our current achievements and standing would not have been possible. I have confidence that with everyone’s dedication, commitment and passion, CoE can scale greater heights and achieve even more in engineering research and education. Let’s make 2017 an even better year!

Sharing Session on Faculty Recruitment

The College organised a sharing session on Faculty Recruitment with the School Search Committee (SSC) Chairpersons and members on 9 December 2016. About 40 faculty members attended the session which was organised to provide insights and tips for faculty recruitment in the schools.

The discussion panel comprised Prof Angela Goh, Associate Provost (Faculty Affairs); Prof Chen Tsuhan, Dean of CoE; Prof Fung Tat Ching, Associate Chair (Faculty) for CEE; and Prof Cheng Tee Hiang, Associate Chair (Faculty) for EEE and was moderated by Prof Lee Pooi See, Associate Dean (Faculty Recruitment and Development). Many issues were discussed during the dialogue including ways to attract good quality candidates to join NTU, how to conduct an effective campus visit and interview, and ways to speed up the hiring process. Generally, those who attended agreed that we should take a more proactive approach in scouting for good candidates, including those who may not have long postdoctoral experience but show great academic potential.

The session ended with a tea reception.
New Research Centres – DSAIR and SPIRIT Centre

Data Science and Artificial Intelligence Research Centre (DSAIR)

In this era where we are surrounded by an abundance of digital information generated from the web, mobile apps, sensors, surveillance, etc., it is imperative that we have the capabilities to extract knowledge and insights from these data, and to turn them into actionable items. This has led to the significant interests and demands in two emerging fields, Data Science and Artificial Intelligence (AI), both of which are at the core of big-data analytics and could yield game changing technologies. In order to seize the opportunities in Data Science and AI, NTU will set up the Data Science and Artificial Intelligence Research Centre (DSAIR). Jointly established by SCSE and SPMS, with $7.7M funding support from NTU, the DSAIR will be co-directed by Prof Ong Yew Soon (Chair, SCSE) and Prof Chee Yeow Meng (Chair, SPMS).

DSAIR aims to develop cutting-edge technologies in Data Science and AI, translate Data Science and AI research into commercial impact, train the next generation of Data and AI scientists and to solve challenges, find efficiencies, and innovate to support the Government’s Smart Nation efforts.

Centre for Smart Platform Infrastructure Research on Integrative Technology (SPIRIT Centre)

The SPIRIT Centre, funded by NRF, is established as a translational R&D institute to design future-proof platform and infrastructure for enabling Smart Nation applications.

Led by Prof Lam Kwok Yam, SCSE and with the involvement of researchers from EEE and SCSE, the SPIRIT Centre will apply cutting-edge systems research to design and build Smart Systems Platform with visual analytics capabilities and sensor networks. The platform will be able to handle massive amount of data from diversified sensing sources via heterogeneous network interfaces, and enable smart nation applications to meet stringent demand performance and security.

The SPIRIT Centre will also serve as a platform to connect the ecosystem of government, academic and industry experts, assist public sector agencies to convert new ideas into innovative Proof-of-Concept solutions leveraging on existing R&D capabilities and technical competencies of NTU researchers, validate and enhance such solutions, and then enable full-scale development and deployment by working with industry partners.

Hardware Assurance Team from Temasek Laboratories @ NTU wins the Defence Technology Prize 2016 Team (R&D) Award

The Hardware Assurance Team from Temasek Laboratories @ NTU was awarded the prestigious Defence Technology Prize 2016 Team (R&D) award by the Ministry of Defence (MINDEF), for its outstanding contribution in the areas of defence science and technology. The multidisciplinary team led by Prof Gan Chee Lip (MSE) and Prof Gwee Bah Hwee (EEE), comprises researchers from the EEE and the Microelectronics Failure Analysis Lab of MSE.

Over the last 10 years, the team has developed physical and circuit analysis techniques and software for advanced integrated circuit chips against hardware Trojans. This is achieved through new sample preparation recipes, efficient high resolution imaging techniques and processing, and automated circuit analysis. The capabilities achieved can ensure the trustworthiness of electronics used in Singapore’s defence systems.
Prof Wang Rong and Prof Anthony G. Fane win the Alternative Water Resources Prize at the 7th Award of the PSIPW

Prof Wang Rong and Prof Anthony G. Fane are the first from Singapore to be awarded the Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW).

Established in 2002, the biennial award from Saudi Arabia recognises top innovative scientific research around the world that alleviates the global problem of water scarcity. Prof Wang, Chair of CEE and Prof Fane, Visiting Professor at NEWRI received the Alternative Water Resources Prize, one of the five prizes under PSIPW.

At the awards ceremony held at the United Nations headquarters in New York on 2 November 2016, Prof Wang received the prize from PSIPW Chairman, H.R.H. Prince Khaled Bin Sultan Bin Abdulaziz and United Nations Secretary-General, Ban Ki-moon, who presided over the event.

The team was recognised for their development and application of novel forward osmosis hollow fibre membranes, which can reduce membrane fouling and scaling. This, in turn, reduces the energy needed in the water reclamation and recycling process. This breakthrough combines forward osmosis, an emerging membrane process for water treatment, with existing technologies such as reverse osmosis, a process commonly used in seawater desalination, to create novel hybrid membrane systems for a wide range of applications.

An improved version of the membrane was recently identified by PUB, Singapore's National Water Agency, as one of the research projects with commercial potential. The public agency is encouraging industry partners to collaborate with the NTU team to commercialise the membranes, with support from research funds administered by PUB.

The new membrane technology is also in trials with industry partners for the treatment of processed water in the oil and gas industry as well as for application in the food and beverage.

Game On!

Young aspiring computer scientists from various junior colleges attended a 4-hour workshop conducted by SCSE students on 22 October 2016 to learn more about the popular game engine, Unity 3D.

The students followed a detailed lesson plan to understand the various functionalities of Unity 3D. As they were generally comfortable with the built-in features, more emphasis was given to the coding aspect of game development during the workshop. Many of the participants were very keen on learning the syntax, meaning and intricacies of the codes.
Game On! (Cont’d)

Apart from developing a simple game in which the player controls a ball to move on a flat surface to collect coins, the participants were also challenged to make this game as fun and interactive as possible. Despite the short duration of the workshop, some of the entries showcased were impressive. For instance, the winner from Meridian Junior College managed to enhance the game to support multiple levels of playing with a unique scoring system. In addition, one had to get the ball to roll off the surface of the last level and land on 1 of 4 separate small, circular platforms in order to win the game instead of merely collecting all the coins. The second and third prizes were awarded to students from Catholic Junior College.

SCSE looks forward to conducting more such exciting workshops in the near future for young budding computer scientists.

Real-time Monitoring System Trial for Rail Network

The Land Transport Authority (LTA) and NTU will roll out a six-month trial for a real-time condition monitoring system for the rail network in 2017. The prototype is expected to pick up problems with the traction power for “preventive maintenance”, and faults can be diagnosed without disrupting normal train operations.

Prof See Kye Yak, Director of Electromagnetic Effects Research Laboratory at EEE said, “During the trial, a device will be installed at a substation supplying power to four or five stations. An electric current will be pinged through the electrical system to establish its profile. Once it is captured by the device, any abnormalities will trigger an alarm, alerting engineers of a possible defect.”

This monitoring system can operate round-the-clock and detect issues arising in-between scheduled maintenance sessions.

Dry Spell? Get Soil to Release Water to Plants

NTU and NParks have developed a substance in a solution that, when sprayed on soil, will release water molecules during scarce rainfall. The NTU team that worked with NParks comprises Prof Lam Yeng Ming and Dr Goh Chin Foo from MSE and Prof Chen Zhong from NIE.

Prof Lam said, "What's exciting about this technology is that it helps water to be absorbed into the soil with little or no surface run-off. In addition, the design of the materials in this formulation can retain excess water and then subsequently release it when the soil becomes dry."

The substance has since been tested on 50,000 plants across 15 to 20 plant species - including the ixora, ipomoea and hibiscus from NParks - at NIE's greenhouse and was found to be environmentally safe. The team has plans to commercialise the technology and hopes that it can one day be used in agriculture.
Major Grants and Awards

Research Collaboration Agreement (RCA) with Building and Construction Authority (BCA)

*Project Title: The Development of Slope Management and Susceptibility Geographical Information System*

Recipient:
Prof Harianto Rahardjo (CEE)

RCA - SHARE (Singapore-HUJ Alliance for Research & Enterprise)

*Project Title: Towards Innovative Manufacturing with Advanced Materials for Energy and Energy-Water Nexus Phase II (NEW-CREATE2)*

Recipients:
Lead PI: Prof Lee Pooi See (MSE)
Co-PIs:
MSE: Prof Lydia Helena Wong, Prof Kong Ling Bing, Prof Madhavi Srinivasan, Prof Alfred Tok, Prof Chen Xiaodong, Prof Zhang Hua, Prof Raju Ramanujan, Prof Xu Zhichuan and Senior Lecturer Long Yi
HUJI: Prof Shlomo Magdassi and Prof Ovadia Lev

IDA Green Data Centre Programme Office

*Project title: Green Data Centres Through Cryogenic Energy System*

Recipient:
Prof Alessandro Romagnoli (MAE)

*Project title: High Ambient Temperature Data Centre with Spray Cooling using a Dielectric Coolant*

Recipient:
Prof Wong Teck Neng (MAE)

IMDA Green Data Centre Programme Office

*Project Title: Toward Joint IT-Thermal Optimisation to Improve Energy Efficiency for High-Ambient Temperature Data Centre in the Tropics via Learning-based Algorithms*

Recipient:
Prof Wen Yonggang (SCSE)
Major Grants and Awards (Cont’d)

Joint R&D grant with IGSS Gan Pte Ltd

**Project title**: III-N Semiconductor Based HEMT Process for Power Switching Devices

Recipient:
Prof Ng Geok Ing (EEE)

Defence Innovative Research Programme

**Project title**: An Infrared Scene Projector: Virtual Reality For Infrared Defence Systems

Recipient:
Prof Cuong Dang (EEE)

CoE at a Glance – New Hires

**A Warm Welcome**

*Faculty members who have joined us recently or will be joining us soon*

- Professor Guan Cuntai (SCSE) – 21 November 2016
- Assistant Professor Zhang Yi (MAE) – 28 November 2016
- Assistant Professor Ng Bing Feng (MAE) – 3 January 2017
- Assistant Professor Chan Wai Lee (MAE) – 1 February 2017
- Assistant Professor Zinovi Rabinovich (SCSE) – 15 February 2017
- Assistant Professor Svetlana Obraztsova (SCSE) – 15 February 2017
- Senior Lecturer Basman Elhadidi (MAE) – 23 December 2016

CoE at a Glance – Faculty Achievements

Recipient: **Prof Wang Zhiwei, CEE**

Award:

Prof Wang Zhiwei won the **2016 Fred Burggraf award** from the Transportation Research Board of the National Academies. This international award recognises excellence in transportation research by researchers 35 years of age or under. This highly competitive award was established from 1966, with one to two winners per year, competing with researchers in all areas of transportation studies from planning and management to structural engineering.
CoE at a Glance – Faculty Achievements

Recipient: **Prof. Er Meng Hwa, EEE**

Award:
Prof Er Meng Hwa, Vice President (International Affairs), has won one of the University of Newcastle Alumni Awards’ most prestigious categories - the Alumni Medal for Professional Excellence – for his outstanding record in leadership, knowledge and professional practice.

Recipient: **Members from EEE SMTB and HPCC**

Award:
NTU won the Red Hat APAC Innovation Awards 2016 for the Smart Mobility Test Bed (SMTB) project. The winning team comprises members from EEE SMTB project and the High Performance Computing Centre (HPCC). The team collaborated with Red Hat to build cutting-edge Intelligent Transportation Systems (ITS) that enhance public transportation services and commuter safety, pushing new frontiers in technology.

Recipient: **EEE’s Satellite Research Centre Team**

Award:
A team comprising EEE’s Satellite Research Centre received the President’s Technology Award for successfully launching Singapore’s first commercial satellite TeLEOS-1. NTU EEE’S SaRC worked collaboratively with industry partners such as ST Electronics (Satellite System) and DSO National Laboratories – in which they contributed to areas such as the design and development of the TeLEOS-1 Satellite System, as well as generous sharing of satellite engineering knowledge and resources.

CoE at a Glance – Upcoming Events

**RNS Men 2017**
Date: 18 February 2017
Time: 10am to 2.30pm
Venue: NTU Campus
Organiser: College of Engineering

Event Synopsis:
CoE, together with the 6 schools, will be organising an event on 18 February 2017 for Returning National Service (RNS) men who had applied to NTU CoE. The objective of this event is to retain the interest and commitment of the RNS men in pursuing engineering with NTU CoE and welcoming them back to student/civilian life. Highlights of the event include a panel session with current students and alumni, campus tour and a networking session with faculty members, current students and staff.
CoE at a Glance – Upcoming Events (Cont’d)

**NTU Open House 2017**
Date: 4 March 2017  
Time: 9.30am to 6.30pm  
Venue: NTU Campus  
Organiser: College of Engineering

Event Synopsis:
This is an annual outreach event that targets A-level graduates, current Junior College, International Baccalaureate and NUS High School students; and the general public. There will be talks by NTU Provost, and various schools. Schools will also put up booths to showcase their programmes and projects as well as conduct school tours for visitors.

**EEE Expo**
Date: 13 March 2017  
Time: 9.30am to 6.00pm  
Venue: Nanyang Auditorium  
Organiser: School of Electrical and Electronic Engineering

Event Synopsis:
EEE Expo will be the first event of its kind where it will present the School of Electrical and Electronic Engineering as a research power house and industry oriented school. It will showcase EEE’s research projects and the corporate laboratories hosted in the school. The event is open to fresh ‘A’ level graduates, existing students and industry representatives. The event will present the research in the following pillars of the new economy: Advanced Manufacturing and Engineering, Health and Biomedical sciences, Services and Digital Economy and lastly, Urban Solutions and Sustainability.

**EEE Career Day**
Date: 13 March 2017  
Time: 1.30pm to 4.30pm  
Venue: Nanyang Auditorium  
Organiser: School of Electrical and Electronic Engineering

Event Synopsis:
The EEE Career Day will be an excellent physical platform to facilitate face-to-face interaction between EEE students and participating companies. Students attending will not only be those nearing graduation but also students who have recently joined the School of EEE.

**High Tea with NTU President**
Date: 18 March 2017  
Time: 1.30pm to 4.30pm  
Venue: Sands Expo and Convention Centre, Marina Bay Sands  
Organiser: Office of Admissions and Financial Aid

Event Synopsis:
This outreach event focuses on the top 15% cohort of 2016 graduated JC2 students, current top JC2 students and their parents. NTU President, Prof Bertil Andersson will deliver a keynote address. There will be a panel session and high tea cum networking session with the Schools’ faculty, staff and current students.
<table>
<thead>
<tr>
<th>Date and Host</th>
<th>Visitors</th>
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| 13 October 2016 School of Mechanical and Aerospace Engineering (MAE) | Red Arrows Meet and Interact Session  
Mr Chris Pook  
British High Commission Lead, UK’s Director for International Trade, Investment and Prosperity in SE Asia  
Mr John Brosnan  
Regional Managing Director for BAE Systems, Southeast Asia and India  
Mr Martin Higgins  
Officer Commanding, Royal Air Force Aerobatic Team (RAFAT) |
| **MSE-Colloquium@NTU Series**  
School of Materials Science and Engineering (MSE) |  
19 October 2016  
Prof William C. Wimley  
Department of Biochemistry and Molecular Biology  
Tulane University School of Medicine  
Prof Wimley gave a talk on “Synthetic Molecular Evolution of Membrane-Active Peptides”. |
| 9 November 2016 |  
Prof Günther G. Scherer  
TUM CREATE, Singapore Energy Research Institute @ NTU  
Prof Günther G. Scherer gave a talk on “NAFION® - What is it? A tutorial approach” |
| 20 October 2016 School of Electrical and Electronic Engineering (EEE) | Mr. Tan Kok Yam  
Head, SNPO |
| 21 October 2016 School of Electrical and Electronic Engineering (EEE) | Ms. Jacqueline Poh  
Chief Executive, GovTech |
## CoE at a Glance - Visitors to CoE (October to December 2016) (Cont’d)

<table>
<thead>
<tr>
<th>Date and Host</th>
<th>Visitors</th>
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<tr>
<td>28 to 31 October 2016</td>
<td><strong>Prof Chen Hongda</strong>&lt;br&gt;Institute of Semiconductors, Chinese Academy of Science</td>
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<tr>
<td>School of Electrical and Electronic Engineering (EEE)</td>
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<td>11 November 2016</td>
<td><strong>Prof Wu Xiaolin</strong>&lt;br&gt;McMaster University, Shanghai Jiaotong University</td>
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<tr>
<td>School of Electrical and Electronic Engineering (EEE)</td>
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<tr>
<td>15 November 2016</td>
<td><strong>Industry Advisory Panel:</strong></td>
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<tr>
<td>School of Mechanical and Aerospace Engineering (MAE)</td>
<td><strong>Dr Tan Kok Tin</strong>&lt;br&gt;Director (Guided Systems)&lt;br&gt;DSO National Laboratories</td>
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<td><strong>Mr Goh Yong Kiat</strong>&lt;br&gt;Executive Vice President, Aviation and Training Services, S’pore Technologies Aerospace Ltd</td>
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<td><strong>Prof Lim Yeow Khee</strong>&lt;br&gt;Managing Director, LYK Aerospace (S) Pte Ltd President, Singapore Institute of Aerospace Engineers</td>
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<td></td>
<td><strong>Dr Timo Bretschneider</strong>&lt;br&gt;Head of Airbus Group Innovations Singapore</td>
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<tr>
<td>16 November 2016</td>
<td><strong>Prof Marc Parlange</strong>&lt;br&gt;Dean, Faculty of Applied Science and Delegation, University of British Columbia</td>
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<td>CoE Dean’s Office</td>
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<tr>
<td>22 November 2016</td>
<td><strong>Mr Desmond Kuek</strong>&lt;br&gt;(President and Group Chief Executive Officer)&lt;br&gt;SMRT Corporation Ltd</td>
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### CoE at a Glance - Visitors to CoE (October to December 2016)(Cont’d)

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<tbody>
<tr>
<td>Tan Chin Tuan Exchange Fellowship FY2016 (Inbound Fellows)</td>
<td>Prof Yusak O. Susilo</td>
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<td>School of Civil and Environmental Engineering (CEE) 4 December 2016 to 2 January 2017</td>
<td>KTH</td>
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<tr>
<td>School of Materials Science and Engineering (MSE) 11 to 14 December 2016</td>
<td>Prof Zhenan Bao</td>
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<td>Stanford University</td>
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