Greetings from the Dean

A very happy new year and I hope you had a good break over the Christmas period. 2015 had been an exciting and busy year for me as I assumed the Deanship at one of the world’s best Engineering Colleges where I have the opportunity to work with a group of very bright and committed faculty, staff and students. It is timely for us to take stock of some of our achievements in 2015 while we work towards a better year in 2016.

Our faculty members have done us proud in 2015. To name a few:

- Prof David Lou Xiong Wen, Prof Huang Guangbin, Prof Ong Yew Soon, Prof Ponnuthurai Nagaratnam Suganthan, Prof Xie Lihua and Prof Zhang Hua were recognised as leading researchers in their respective subject fields from around the world in the prestigious Highly Cited Researchers report from Thomson Reuters released in December 2015.

- Prof Louis Phee Soo Jay, Prof David Lou Xiong Wen, Prof Lee Pooi See and Prof Hilmi Volkan Demir won the NRF Investigatorship Awards of up to $3M each to further their research.

- Prof Liu Linbo won the NRF CRP 13th grant call with a research quantum of approximately $8M.

We have also been successful in recruiting more recognised research leaders as faculty members. The faculty members who have joined us recently or will be joining us soon are:

- Prof Lam Kwok Yan (SCE) - November 2015
- Asst Prof Lee Seok Woo (EEE) - January 2016
- Asst Prof Dang Thuy Tram (SCBE) - January 2016
- Asst Prof Ran Ni (SCBE) - March 2016
- Asst Prof Grezgorz Lisak (CEE) - April 2016
- Asst Prof Leong Weilin (EEE & SCBE) - June 2016

The College continued its ascent in various international ranking tables and remains a leader in the engineering research and education arena. In the...
Greetings from the Dean (Cont’d)

recent 2016 U.S. News & World Report’s global ranking of best universities in engineering, NTU Engineering was placed 5th among all engineering institutions in the world and 3rd in Asia. We were ranked 11th globally and 1st in Asia for Engineering in the Academic Ranking of World Universities 2015 released by Shanghai Jiao Tong University. We were also ranked 6th in the world and 2nd in Asia for Engineering in the QS Global Academic Survey. In the Essential Science Indicators 2015, NTU Engineering research output was among the top five globally and the 5th most-cited worldwide.

Our schools have been actively engaged in partnerships and collaborations with industry leaders. To illustrate, the School of Electrical and Electronic Engineering (EEE) has partnered the Dutch semiconductor company NXP to build a NTU-NXP Smart Mobility Test Bed. This live test bed, located on campus, will develop advanced Vehicle-to-Vehicle and Vehicle-to-Infrastructure technologies. Supported by the Singapore’s Economic Development Board to the tune of $22 million, this project will pave the way to realise Singapore’s Smart Mobility 2030 vision.

In the education arena, we launched a new second major in Society and Urban Systems in AY 2015/16. Jointly offered with the College of Humanities, Arts and Social Sciences, the programme aims to impart multi-faceted knowledge of complex urban systems and develop useful skills, and possible solutions for a sustainable built environment. Our outreach efforts are also important in reaching out to potential students as the competition for top students amongst the Institutions of Higher Education intensifies. The College and Schools’ outreach teams organised several outreach events to engage these potential students. I attended the inaugural CoE Open House 2015 that was organised for the JC and IP students in December 2015 and was very encouraged by the enthusiasm of the faculty, staff and participants.

Going forward, I am filled with optimism in this new year. In research, we shall continue developing strategic alliances with industry partners. We will also proactively recruit exceptional talents who can join the current faculty members to propel the College into the next epoch of engineering breakthroughs and discoveries. Nurturing creative and entrepreneurial leaders is another mission of the College. To this end, we will continue to develop innovative programmes that are not only multi-disciplinary but also industry-relevant, in tandem with the changing technological needs. For the coming AY 2016/17, we will be introducing the following new programmes:

- Bachelor of Engineering in Bioengineering or Materials Engineering with a Second Major in Pharmaceutical Engineering
- Bachelor of Engineering in Bioengineering with a Second Major in Food Science and Technology

I am confident that with your dedication, commitment and passion, we can scale greater heights and achieve even more in engineering research and education in 2016. Let’s make 2016 an even better year for all of us!

100th College of Engineering Executive Committee Meeting

The College celebrated the 100th CoE ExCo Meeting on 23 October 2015 with a simple cake-cutting ceremony to commemorate this significant milestone. The ExCo, which is the highest decision-making body in the College, comprises the Dean and the Chairs, assisted by the Associate Deans. The first ExCo meeting was convened on 1 September 2004. Over the years, ExCo has provided academic leadership and stewardship to the College. A big thank you to the past and present Deans, Chairs and Associate Deans for their contributions to ExCo that has no doubt raised our profile and academic standing both within and outside of NTU.
CoE Funded Projects

The College will be awarding a total of about $330K of Industry Collaborative Grants to 4 projects with company partners that are new to CoE. They are:

a. Prof Wu Kan (MAE): *Collaborative intelligence on productivity improvement in a smart fab*, with United Microelectronics Corporation
b. Prof Chen Xiaodong (MSE): *Ultrafast charging lithium-ion batteries for hearing aids*, with Sivantos Pte Ltd
c. Prof Cleo Choong (MSE): *From waste-to-resource: optimisation of processing conditions for transforming aquaculture waste to useful biomedical materials*, with The Fish Farmer
d. Prof Liu Zheng (MSE): *Two-dimensional materials: from synthesis to commercialisation*, with Wintech Nano-Technology Services Pte Ltd

This is the second call in FY2015 following earlier grant awards amounting to approximately $250K in August 2015. This is CoE’s initiative to attract industry funding through project initialisation with new industry partners and to provide a springboard for faculty to apply grants from external funding agencies eventually.

New Undergraduate Programmes for AY 2016/2017

Two new Second Major programmes will be offered in the upcoming admissions exercise. Here are some details.

**Second Major in Pharmaceutical Engineering for Bioengineering and Materials Engineering Programmes**

Singapore has positioned itself as a strong biopharmaceutical manufacturing hub since the early 2000s and is today a top manufacturing site for active pharmaceutical ingredients and solid dosage drugs for the global market. More than 30 of the world’s leading biopharmaceutical companies have made Singapore their global manufacturing base. This has driven an increasing demand for biopharma engineers and related research and innovation. The new Second Major in Pharmaceutical Engineering (PE) will prepare students for exciting and impactful careers in the vital pharmaceutical industries spanning key sectors such as pharmaceutical and biotechnology, biomedical and clinical sciences, healthcare, research and development. In 2016, the PE will be launched as an option with two current degree programmes for prospective students:

- Bioengineering with a Second Major in Pharmaceutical Engineering
- Materials Engineering with a Second Major in Pharmaceutical Engineering

**Second Major in Food Science and Technology for Bioengineering Programme**

As Singapore is set to become an international hub for food processing, NTU forged a strategic partnership with Wageningen University in 2014 to offer a Second Major in Food Science and Technology (FST), in expectation of a greater demand for skilled personnel in this discipline. The FST second major has been offered for degree programmes in Chemistry and Biological Chemistry, Biological Sciences, and Chemical and Biomolecular Engineering. From 2016, students in the Bioengineering programme will also have the option of taking up FST second major.

IES Gold Medallists

11 graduates from the Class of 2015 were awarded IES Gold Medals at the IES Annual Dinner held on 11 November 2015, up from 5 awards in previous years. Recipients were the top graduating students from each accredited Bachelor of Engineering programme. The 14K gold medals bearing the IES crest, NTU’s name and engraved with the recipients’ names were presented by Er. Ho Siong Hin, IES past President and Chairman of the IES Awards Committee.
IES Gold Medallists (Cont’d)

Honour Roll
Mr U S Vevek, Aerospace Engineering
Mr Yin Yuan, Bioengineering
Mr Zhong Yongjian Jackson, Chemical and Biomolecular Engineering
Ms Mediana, Computer Engineering
Ms Zhang Xingjia, Computer Science
Ms Kang Yin Teng, Civil Engineering
Ms Anastasia Nissa Melina, Environmental Engineering
Mr Tan Chun Yang, Electrical and Electronic Engineering
Mr Zhong Huiwen, Information Engineering and Media
Ms Ouyang Xin, Materials Engineering
Mr Long Zhaowen, Mechanical Engineering

CoE Open House 2015

The College of Engineering organised its first CoE Open House on 11 December 2015, drawing student participants from 16 Junior Colleges. The half-day event provided a platform for them to gain a better understanding of the College and its engineering courses through informative and interactive sessions.

It was a fun-filled afternoon that followed after the Dean’s warm address and Prof Timothy Tan’s sharing session. Participants got to view live project demonstrations and take part in the hands-on activities brought to them by our 6 engineering schools during the Engineering in Action! segment.
The participants were fascinated by the ‘hands-free’ activities at EEE’s mind-controlled Mastermind game and SCE’s gesture-controlled quadcopter drone. They also cracked their heads to transfer the theories they have learnt to the action-packed challenges by SCBE (Chem-E-Car Challenge) and MAE (Flying of foam planes). Over at CEE and MSE, they were treated to an exciting time at the driving simulator and the project demonstrations. Not only did the participants have fun, they also gained insights and learnt about the engineering science behind these innovations.

The Open House also showcased performances by NTU student clubs – Guitar Ensemble, Breakers, as well as Soul Funky Pop and Lock. A photo booth was available for participants to bring home their photo memories, and scrumptious snacks and lunch were also served.

We would like to thank all students, staff and faculty for their enthusiastic participation and we look forward to future events like this to spread the CoE spirit to more potential students!

Nobel Prize Series Public Lecture #3: The Relationship between Science and Art

CoE is honoured to organise one of the public lectures for the Nobel Prize Series Singapore 2015: The Future of Learning. The Public Lecture titled ‘The Relationship between Science and Art’ by two Nobel Laureates, Sir Harold Kroto (Chemistry, 1996) and Prof. Ada Yonath (Chemistry, 2009) was attended by about 200 guests at the City Hall Chamber in National Gallery Singapore on 6 November 2015.

Moderated by Prof. Lee Pooi See from the School of Materials Science and Engineering (MSE), the Nobel Laureates discussed the fascinating interrelationships between science and art, and explored the points of interface between the ‘two cultures’. It was an invaluable opportunity for the guests to hear and gain insights from not one, but two Nobel Laureates.

The public lecture ended with a tea-reception for the attendees while the Nobel Laureates proceeded further with an in-depth dialogue session with a group of NTU graduate and undergraduate engineering students. The students had an exclusive and intimate interaction session with the Nobel Laureates where they had a chance to raise questions related to the topic of the public lecture.

The event concluded with a sumptuous lunch for the Laureates and students. We would like to thank Prof Lee for her excellent moderation of the public lecture and the ensuing discussions.
2016 Singapore International 3D Printing Competitions

Organised by the Singapore Centre for 3D Printing, the Singapore International 3D Printing Competitions are back for its 4th successful run in 2016. In the spirit of technology's blend with fashionwear, 2016’s competitions feature the exciting themes of Eyewear and Shoes!

Launched in 2013 with an objective to promote awareness and adoption of 3D printing technologies, the competitions are open to the general public (open category) with a top prize of $10,000, as well as tertiary and secondary students (student category) with top prizes of $5,000 per theme.

In these upcoming competitions, aspiring designers are challenged to 3D print disruptive, breakthrough, fashionable yet functional eyewear designs instead of factory-produced run of the mill spectacles in the Eyewear competition. In the Shoes competition, designers are encouraged to design fashionable and functional shoe designs (UK Size 5-8) that showcase the capabilities of 3D Printing. Comfort and form fit will also be important evaluating factors in this competition.

Previous editions of the competition resulted in some very exquisite entries such as the printed hairpin that won 2014’s jewellery category. 2015’s winning team for vintage toys came up with a pseudo X-shaped 3D cube with 18 faces, a variant of the traditional 3x3x3 Rubik’s cube.

The competitions deadline is 8 April 2016, Friday. Take up the challenge now to design and print the very next 3D printed eyewear or shoe!

For full details, go to: http://sc3dp.ntu.edu.sg/pages/3dprintingcompetitions.aspx

Airbus Defence and Space Signed R&D Agreement with NTU on Satellite Interference Management

Airbus Defence and Space and Nanyang Technological University, Singapore have signed a research and development agreement following a call for innovative research proposals named “Astrium Innova”.

The agreement, signed at the Singapore Space Symposium at NTU Singapore on 29 September 2015, will focus on NTU’s winning research proposal “Interference Management for Emerging Satellite Communication Networks”.

The present project will look to identify innovative methods to manage interference that will increase in future high capacity multi-beam satellite transmissions, as technology advances and the market expands. This will enable greater growth opportunities for operators, especially using multi-beam and multi-satellite systems.

The project will involve a core team at NTU Singapore working together with Airbus Defence and Space in the UK and Airbus Group Innovations in Singapore.
NTU successfully launched its fifth and sixth satellites on 16 December 2015. One is a climate monitoring and navigation satellite, and the other is the university’s first satellite with a commercial payload. The 123-kg climate monitoring and navigation satellite, VELOX-CI, is to study Asia’s tropical climate and test a new navigation system. This will orbit the Earth for the next three years. The smaller 12-kg VELOX-II is carrying an experimental “communication-on-demand” technology that will be tested over one year.

Using radio occultation and advanced algorithms, VELOX-CI is able to obtain weather data such as the upper atmospheric temperature, humidity and pressure, which are useful for long term climate studies. In addition, it will also test NTU’s newly developed GPS hardware and software, which can determine the satellite position and velocity more accurately in the sub-metre and millimetre per second range. Besides providing real-time orbit position, it also allows accurate reconstitution of the satellite trajectory. This new navigation system can allow NTU scientists to determine the satellite’s orientation by applying an advanced signal processing technique.

The mission of VELOX-II is to test an innovative data relay technology developed by Addvalue Innovation Pte Ltd. VELOX-II is also testing out a new radiation-resistant hardware designed at NTU.

The two NTU satellites were launched from India’s Satish Dhawan Space Centre on the Indian Space Research Organisation’s Polar Satellite Launch Vehicle (PSLV-C29) rocket, together with Singapore’s first commercial earth observation satellite TeLEOS-1 and three other Singapore satellites.

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Research Grants and Awards

**Singapore Millennium Foundation Grant Award**

*Project Title: “Think on Your Feet – Learning Through Purposeful Collaborative Play and Movement”*

**Recipients:**
- Prof Goh Wooi Boon (SCE), Principal Investigator
- Prof Kenneth Poon Kin Loong (NIE), Co-Investigator
- Mr Oh Hong Lye (SCE), Collaborator

**Grant Quantum:** Approximately S$544,000

**Project Details:**
This project aims to develop and deploy technology-supported tools that will ease the design and implementation of learning environments to bring the three elements (collaboration, play and physical movement) together in a purposeful manner. Researchers will embark on a three-year research journey with two Special Education (SPED) schools in Singapore to investigate the design, implementation and effectiveness of learning paradigms that incorporate collaborative play and movement.
NRF-ANR Joint Grant Call

Project Title: “Precipitation of Artificial Structural Proteins and Polysaccharides into Nanocapsules”

Recipient:
- Prof Ali Miserez (MSE)

Grant Quantum: Approximately S$429,000

Project Details:
This French-Singaporean international project, PREPROPOSAL, addresses the development of biorelevant sub-100nm functional biopolymer-based nanocapsules for drug delivery applications. PREPROPOSAL aims at mastering the nanoprecipitation process, an extremely easy-to-handle methodology that holds great promises in nanomedicine, to conceive stimuli-responsive biodegradable protein/polysaccharide nanocapsules displaying high structural integrity and tunable diffusion barrier properties in benign conditions.

CoE at a Glance – Faculty Achievements

We would like to congratulate the following faculty members on their achievements.

Recipient: **Prof Wen Yonggang, SCE**

Award:
**Winner** of the “2015 DatacenterDynamics Asia Pacific Awards”, in the category of ‘Open’ Data Center Project

Recipient: **Prof Liu Ai Qun, EEE**

Award:
Elected as a **Fellow of the Optical Society (OSA)** in 2016 for his meritorious accomplishments in the research fields of Photonics MEMS/NEMS and Optofluidics.

Recipient: **Prof Harioanto Rahardjo, CEE**

Award:
**Winner** of the “Inaugural Asia-Pacific Distinguished Lecture on Unsaturated Soils” at the 6th AP-UNSAT Conference in Guilin, China
CoE at a Glance – Faculty Achievements (Cont’d)

Recipient: Dr Cise Unluer, CEE
Award: Winner of the inaugural “John Cheung Social Media Award 2015, NTU”

CoE at a Glance – Upcoming Events

**Materials Exposition Week 2016**
Date: 15-20 February 2016
Venue: NTU Campus
Organiser: School of Materials Science and Engineering (MSE)

Event Synopsis:
Materials Exposition Week 2016 is an annual exclusive event for MSE students. During the week-long event, students will get ample opportunities to interact with senior students to find out about student life experience and career opportunities. MSE senior students will provide useful information on professional internships, overseas attachments and final year projects. A series of fun-filled activities such as workshops, seminars and industry visits will also be arranged. The event will end with a mini carnival for prospective students from the various junior colleges and polytechnics.

**RNS Men 2016**
Date: 20 Feb 2016
Time: 10am to 2pm
Venue: NTU Campus
Organiser: College of Engineering (CoE)

Event Synopsis:
This outreach event aims to retain the interest of RNS men who have already accepted a place with NTU CoE and will be matriculating in AY 2016/2017. 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.

**NTU Open House 2016**
Date: 5 March 2016
Time: 9.30am to 6.30pm
Venue: NTU Campus
Organiser: Office of Admissions and Financial Aid (OAFA)

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 President, Prof Bertil Andersson and various schools. Schools will also put up booths to showcase their programmes and projects as well as conduct school tours for visitors.
QS Subject Focus Summit – Electrical and Electronic Engineering  
Date: 9-11 March 2016  
Venue: Grand Hyatt, Singapore  
Organisers: School of Electrical and Electronic Engineering (EEE) and QS Asia

Event Synopsis:  
The QS Subject Focus Summit – Electrical and Electronic Engineering brings together for the first time academics, senior higher education administrators and industry professionals from Electrical and Electronic Engineering (EEE) and related domains. By providing a global forum for networking and the exchange of new ideas, the Summit aims to bring about a deepened and shared understanding of the challenges and opportunities facing EEE, and the strategies needed to overcome them.

For more information, please visit: http://qssubjectfocus.com/eee-2016/

NTU Hackathon on Digital Economy & Services  
Date: 12 March 2016  
Venue: NTU Campus  
Organiser: College of Engineering (CoE)

Event Synopsis:  
This hackathon invites all NTU staff and students to put up ideas related to digital technologies and its application to a digital economy. The challenges for this hackathon are:  
(i) Digital Services  
How to use digital technology to enable or create new services for work, living, and play such that productivity, quality of life, fun, and many other facets of the economy and life can be improved?  
(ii) Digital Goods  
How to use digital technology to improve or innovate better industry or business processes that can yield higher value services, products, and goods?

For more information, please visit: http://ntu.hackathon.com

High Tea with NTU President 2016  
Date: 26 March 2016  
Time: 1.30pm to 4.30pm  
Venue: The Sands Expo and Convention Centre, Marina Bay Sands  
Organiser: Office of Admissions and Financial Aid (OAFA)

Event Synopsis:  
This outreach event focuses on the top 15% cohort of 2015 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.

2nd International Conference on Progress in Additive Manufacturing (Pro-AM 2016)  
Date: 17-19 May 2016  
Venue: Nanyang Executive Centre, NTU Campus  
Organiser: Singapore Centre for 3D Printing (SC3DP)

Event Synopsis:  
In this conference cum exhibition, Pro-AM 2016 brings to you the latest commercial and scientific progress in Additive Manufacturing. Attendees will learn about scientific breakthroughs and technological advances in Additive Manufacturing from global subject matter experts and researchers and also view the latest technologies and applications that will be displayed by commercial market players at the trade exhibition.

For more information, visit the website at: http://www.pro-am2016.com/
### CoE at a Glance – Visitors to CoE (October to December 2015)

<table>
<thead>
<tr>
<th>Date and Host</th>
<th>Visitors</th>
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<tbody>
<tr>
<td><strong>9 October 2015</strong>&lt;br&gt;Dean’s Office, School of Chemical and Biomedical Engineering (SCBE) and School of Mechanical and Aerospace Engineering (MAE)</td>
<td>38 students from Meridian Junior College</td>
</tr>
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| **12 November 2015**<br>Dean’s Office | School of Engineering of CASE Western Reserve University. Visitors were:  
1. Dr. Jeffrey Duerk  
   Dean, Case School of Engineering  
   Leonard Case Professor of Engineering  
   Director, Case Center for Imaging Research  
2. Dr. Daniel Ducoff.  
   Associate Dean, Development and Global Relations  
   Associate Vice President, Strategic Development Initiatives  
3. Ms. Anne E. Cunningham  
   Senior Director of Development  
   Case Alumni Association |
| **25 November 2015**<br>Dean’s Office, School of Computer Engineering (SCE) and School of Materials Science and Engineering (MSE) | Hwa Chong Institution – 6 student facilitators from HCI, 48 student delegates and 7 teachers from Indonesia, Australia, Korea, China and Singapore |