Dear PhD Applicants,

It is a great honour and pleasure to connect with you, as you consider embarking on the exciting journey of graduate-level studies. The Engineering Product Development (EPD) pillar provides a multi-disciplinary experience in world-class research, education, professional development, entrepreneurship, and design for the benefit of society.

As part of SUTD’s distinctive and unique university structure, the EPD pillar’s mission is to prepare graduate-level leaders in the conception, design, implementation, operation, and sustainability assessment of innovative systems and products. The development of these systems and products cuts across traditional boundaries.

EPD represents the academic spectrum of basic sciences and exploration of fundamental knowledge to a cross-section of engineering disciplines, design science, and the creation of new systems and technologies. Across this spectrum, the pillar provides unique prospects to develop skill sets as a systems thinker, innovator, designer, and technically-grounded leader.

As you pursue a PhD in EPD, you will engage in cutting-edge studies and research with distinguished faculty members in quantum physics, optics, and photonics; materials science; biomedical engineering; robotics, automation, and control; electrical and mechanical engineering; and design science. You will have opportunities to work with our collaborators in eminent institutions such as the Massachusetts Institute of Technology (MIT) and Zhejiang University (ZJU), pursue graduate-level design and internship experiences with our industry partners, and participate in recognised research centres, such as the SUTD-MIT International Design Centre (IDC), the Lee Kuan Yew Centre for Innovative Cities (LKY CIC), and Temasek Laboratories.

If you seek excellence and creative pursuits in solving the world’s grand challenges, we look forward to you joining the EPD family.
### Course Overview
The EPD PhD programme provides a comprehensive and intensive approach in the study of products and their design, whose development cuts across traditional disciplinary boundaries. Through a combination of cutting-edge research and a sound understanding of design principles, students will engage in the development of engineering products to meet society's needs and also in the exploration of new scientific breakthroughs as the emerging technology for future applications.

### Highlights of the EPD PhD
- Strong emphasis on interdisciplinary and collaborative research
- Participation in an innovation and entrepreneurship ecosystem
- World-class faculty with co-supervision flexibility
- Opportunities for industry internships and overseas research attachments
- Multi-disciplinary design experience
- Professional development programme and teaching experience

### Professional Development Programme
A signature element of the SUTD PhD Programme, it is developed to groom students for a head start and early positioning in the career and industry of their choice. Students will be exposed to an array of networking seminars, personal effectiveness workshops, leadership and research-related core skills workshops, mentorship, innovation and incubation hands-on practice.

### Start Something @ SUTD
An experiential programme to educate, expose and support students in entrepreneurship via a series of workshops conducted by entrepreneurs and industry experts.

### EDB-Industrial Postgraduate Programme
The programme is an initiative by the Singapore Economic Development Board (EDB) to develop a pool of postgraduate manpower with essential R&D skill sets for roles in the industry. IPP trainees are provided with postgraduate training in a corporate R&D environment through EDB’s partnership with companies and SUTD.

### Careers
Our graduates have the potential to be leaders in academia, research institutions, industry and start-up companies. Career opportunities span broad technical areas such as robotic systems, automated systems, aerospace, microelectronics, optoelectronics, information technology, digital media, healthcare, energy, defence, manufacturing industries and many others.
The discovery of quantum mechanics in the early twentieth century brought about a revolution in our understanding of physics, and with this came a revolution in technology. This increased understanding of fundamental physics has made possible a wide variety of modern technologies which exploit quantum effects, including integrated circuits, digital imaging, lasers and GPS. Devices which are wholly reliant on quantum effects have become so ubiquitous that the modern world would be unrecognisable without them. Research on quantum technologies at SUTD covers both fields which have potential near-term industry impact such as photonics, as well as emerging technologies, like quantum information processing, offering students the opportunity to help shape our future technological development.

Applied complexity

ROLAND BOUFFANANIS
ASSISTANT PROFESSOR
Ph.D. Swiss Federal Institute of Technology Lausanne
Research Interests:
• Complexity science
• Mechanobiology of cellular motility
• Complexity of turbulent flows

Molecular biochemistry

RAJESH CHANDRAMOHANADAS
ASSISTANT PROFESSOR
Ph.D. Philipps University-Marburg, Germany
Research Interests:
• Infectious disease research
• Drug discovery
• Chemical biology and proteomics
• Cell bio-mechanics

Biomedical science

DAWN C. I. KOH
LECTURER
Ph.D. National University of Singapore
Research Interests:
• Neurobiology
• Oncology
• Medical technology

BioMEMS and nanofluidics

YE AI
ASSISTANT PROFESSOR
Ph.D. Old Dominion University
Research Interests:
• Micro/nanofluidics
• BioMEMS
• Biosensing

Infocomm and wireless communications

YUEN CHAU
ASSISTANT PROFESSOR
Ph.D. Nanyang Technological University
Research Interests:
• Wireless green communications
• Machine-to-machine for smart city
• Smart grid
• Distributed storage
• Security
Can you imagine our life without computers, internet, mobile phones, and others? Thanks to electronics, this world changing technology has made our daily life easier and better, and given impetus to developments in almost every field. As we move deeper into the era of nanoelectronics, the electronic devices, circuits and systems at the nano-scale have opened up new and exciting possibilities of the next generation electronics. Faculty members in EPD are actively involved in both fundamental and applied research of new nano-scale electronic devices and systems that will lead to many future inventions, as well as deliver major improvement in device density, power, and performance. The research areas cover advanced quantum devices, advanced photonics/plasmonics devices, advanced solid state memory, microelectromechanical-systems (MEMS), and bio-inspired electronics.

Applied physics and advanced quantum devices

RICKY ANG
ASSOCIATE PROFESSOR
Ph.D. University of Michigan
Research Interests:
• Plasma
• Electron beam
• Quantum diode
• Quantum plasmonic
• Novel material-based devices

CHEAH CHIN WEI
SENIOR LECTURER
Ph.D. National University of Singapore
Research Interests:
• Semiconductor quantum devices
• Semiconductor manufacturing processes
• MEMS-based energy harvester

Applied physics, MEMS and semiconductor devices

RICHTER VINCENT
LECTURER
Ph.D. National University of Singapore
Research Interests:
• Digital electronic circuits design and optimisation
• Digital FIR filter design
• VLSI design
• EEG digital signal processing

Reliability of nanoelectronic device and system

PEY KIN LEONG
PROFESSOR AND ASSOCIATE PROVOST (EDUCATION)
Ph.D. National University of Singapore
Research Interests:
• Physical analysis of gate oxide breakdown
• Physical analysis of switching devices
• Stress migration and electromigration
• Nanoelectronic device reliability

Digital design and digital signal processing

Applied physics and advanced integrated circuit design

TEO TEE HUI
LECTURER
Ph.D. Nanyang Technological University
Research Interests:
• Mixed-signal radio frequency integrated circuit
• Ultra low-power and low-voltage system on-chip
• Device characterisation, modeling and reliability
• Electronic design automation and optimisation

Advanced photonics/plasmonics devices

JOEL YANG
ASSISTANT PROFESSOR
Ph.D. Massachusetts Institute of Technology
Research Interests:
• Nanoplasmonics
• Electrical-excitation of plasmons
• Nanofabrication
• Electron-beam lithography
• Self assembly

Advanced memory and MEMS devices

ZHANG RONG
ASSOCIATE PROFESSOR
Ph.D. National University of Singapore
Research Interests:
• Data storage technologies
• Advanced non-volatile memories
• Brain-inspired cognitive memory
• Reconfigurable devices
• Energy harvesting MEMS devices
Inorganic materials

ZURUZI ABU SAMAH  
SENIOR LECTURER  
Ph.D. University of California, Santa Barbara  
Research Interests:  
- Materials for catalysis, sensing and energy  
- Materials and fabrication technologies for MEMS

Nanomaterials and design

FRANKLIN ANARIBA  
LECTURER  
Ph.D. The Ohio State University  
Research Interests:  
- Nano electronic materials  
- Sensors and bio devices  
- Molecular electronics  
- Concept mapping in design

Biomaterials

AVINASH BAJI  
ASSISTANT PROFESSOR  
Ph.D. University of Akron  
Research Interests:  
- Polymer nanotechnology  
- Polymer fibers for functional applications

Inorganic chemistry and supramolecular materials

SREENIVASULU BELLAM  
LECTURER  
Ph.D. National University of Singapore  
Research Interests:  
- Supramolecular chemistry  
- Metallo-supramolecular polymers  
- Functional materials  
- Biomimetic enzyme catalysis  
- Coordination chemistry  
- Chemistry education

Materials and photonics

KWAN WEI LEK  
LECTURER  
Ph.D. University of California, Los Angeles  
Research Interests:  
- Organic electronics  
- Chemical/bio sensors  
- Photovoltaics  
- Near infrared dyes  
- Resistive memory  
- Novel material-based devices

Macromolecular science

LOW HONG YEE  
ASSOCIATE PROFESSOR  
Ph.D. Case Western Reserve University  
Research Interests:  
- Micro and nanopatterning  
- Nanocomposites  
- Biomimetic surfaces

Structural nanomaterials – nanomechanics

ARIEF SURIADI BUDIMAN  
ASSISTANT PROFESSOR  
Ph.D. Stanford University  
Research Interests:  
- Advanced structural and multi-functional nanomaterials  
- Nanomechanics for extreme environments  
- Design for reliability for advanced solar PV (photovoltaic) systems  
- Advanced digital manufacturing (3D printing)

Multi-functional composite nanomaterials

TAN MEI CHEE  
ASSISTANT PROFESSOR  
Ph.D. National University of Singapore  
Research Interests:  
- Solution-based processing of nanomaterials  
- Multi-functional composite fabrication  
- Structure-property relationship of multi-scale composites

Green composite materials

REGINALD THIO  
ASSISTANT PROFESSOR  
Ph.D. Georgia Institute of Technology  
Research Interests:  
- Biomimetic surfaces  
- Micro and nanoparticles  
- Particulate transport  
- Composite materials

Materials science

ROBERT EDWARD SIMPSON  
LECTURER  
Ph.D. University of California, Santa Barbara  
Research Interests:  
- Nanomaterial synthesis and applications  
- Nanomaterial functionalisation and characterisation  
- Device fabrication and analysis

Novel functional nanomaterials

LEE CHEE HUEI  
LECTURER  
Ph.D. Michigan Technological University  
Research Interests:  
- 2-dimensional and 3-dimensional nanomaterial synthesis and applications  
- Nanomaterial functionalisation and characterisation  
- Device fabrication and analysis

Electronics nanomaterials

WU YING  
ASSOCIATE PROFESSOR  
Ph.D. University of Montreal, Canada  
Research Interests:  
- Chemical thermodynamics/kinetics  
- Computational quantum chemistry  
- Materials informatics  
- Green energy devices  
- Biomedical devices  
- Designer 2D-electronic structures

Energetic nanomaterials

YANG HUI YING  
ASSISTANT PROFESSOR  
Ph.D. Nanyang Technological University  
Research Interests:  
- Low dimensional nanostructures – synthesis and applications

Theoretical condensed matter physics

YANG SHENGYUAN  
ASSISTANT PROFESSOR  
Ph.D. University of Texas at Austin  
Research Interests:  
- Properties of novel 2D materials  
- Quantum transport  
- Topological effects in condensed matter  
- Spintronics and micromagnets

Advances in energy, electronics, photonics, aerospace and the ways for next generation, design-enabling such innovative technologies that would pave the way for next generation, design-enabling energy, electronics, photonics, aerospace and biomedical devices for better living tomorrow. From nanomaterials in battery technology, to advanced design of solar photovoltaics systems, to cutting edge structural and functional materials in extreme environments and to biomaterials and bio-inspired systems for medical and environmental needs of the world – we have faculty members leading the charge to a better tomorrow.
Human/Machine Interfaces, Robotics, Automation & Control

Robotics is the emerging branch of technology that deals with the conception, analysis, design, prototyping, operation, and application of novel robots and intelligent machines. It is a highly multi-disciplinary field which encompasses elements of materials, mechanical, electrical, control and computer engineering and science. While interest in such technologies was nurtured by the impetus to devise automated machines that can take the place of humans in dangerous, hazardous and unpleasant environments, their capabilities and applications have evolved to the point where robots and intelligent machines can now be found in almost every industry and even in our homes. You see them exploring the vast solar system and increasingly used by surgeons to perform complex life-saving procedures. In the not too distant future, with the advent of autonomous, self-navigating cars, driving your car may be a thing of the past. Here at EPD, significant research is currently underway to advance and design robotic systems and related technologies in a multitude of domains including medical, industrial, service and defence.
SUTD is the place where blue sky meets the earth: creative ideas are fostered into innovative designs, and EPD provides the interdisciplinary platform to materialise those designs into products or systems for the real world.

Having worked in mechanical engineering, robotics, and programming, interesting things seem to happen at the borders between traditional engineering fields. SUTD’s interdisciplinary approach holds the promise of some very interesting research.

KUAN YOKE KONG

SUTD President’s Graduate Fellowship
This bond-free fellowship (up to 5 years) is open to all nationalities, and is awarded on a competitive basis to outstanding full-time PhD Programme applicants (e.g. those with a Bachelor’s Degree 1st Class Honours or equivalent). The fellowship supports:

• Full tuition fees
• Monthly stipend of S$3,000 for each awarded scholar and up to 10% additional stipend for Singapore Citizens and Permanent Residents
• Annual conference funding
• Opportunities for overseas research attachments and/or industry internships

How to Apply
Applicants should possess at least a Bachelor’s degree with excellent academic standing.
Submit your online application at https://admissions.sutd.edu.sg/phd with the following.
• Transcripts and certificates for any academic degrees earned or currently in progress.
• Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score report, if the medium of instruction at your undergraduate institution was not English.
• Graduate Record Examinations (GRE) score report (optional).
• Letters of recommendation from at least 3 references.
• A Statement of Objectives of about 3,000 words.
Shortlisted applicants may be asked to attend Skype interviews or in some cases, face-to-face or telephone interviews may be arranged. Please refer to http://www.sutd.edu.sg/phd_application.aspx for details.

Contact Us
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Website: http://epd.sutd.edu.sg

Information is correct as of November 2013.