

# Hwee-Xian TAN



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*Last updated: July 25, 2017*

## education

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### **Ph.D.** Jan 2005 - May 2011

School of Computing, National University of Singapore, Singapore  
Thesis topic: Communication Protocols for Energy-Constrained Networks  
Advisor: A/P Mun-Choon CHAN

### **B. Computing (Computer Engineering)** Jul 2001 - Dec 2004

Second Class Honors (Upper) with Minor in Technopreneurship  
School of Computing, National University of Singapore, Singapore  
Thesis topic: Dynamic Adaptation of MANET Routing Protocols  
Advisor: Prof. Winston SEAH

## r&d experience

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My current research interest is to use applied research and technology to build intelligent, inclusive and integrative societies, to improve the lives of vulnerable groups of people - such as the elderly and persons with disabilities. I play in the arena of networked embedded sensor systems and Internet of Things (IoT), and dabble in data analytics and crowdsourcing. I am excited about building scalable and reliable large-scale systems, and deploying them in the wild, for use by real stakeholders.

### **SAMBA** @ SMU, Singapore (expected commencement date: Jan 2018; Role: Co-Investigator)

#### **Smart Accessibility & Mobility for Barrier-free Access**

SAMBA aims to design a scalable, self-sustaining system that can collect, classify and determine accessible point-to-point routes that are suitable for barrier-free access. This system relies primarily and heavily on passive crowdsourced data collection in order to overcome the problem of volunteer and user fatigue. The project is approved for funding by the Tote Board - Enabling Lives Initiative (TB-ELI) Grant Call 4. As the Co-Investigator of SAMBA, my primary role is to ensure that there is a reliable and energy-efficient system that can collect data from sensors that are placed on the wheelchairs of volunteers, and translate these sensor readings into measures of wheelchair accessibility. Through SAMBA, we hope to build a more inclusive society in Singapore.

### **NUHS** @ SMU, Singapore (Oct 2016 - present)

#### **In-Home Sensors for Assessment of Cognitive and Psychological Health of Older Adults: A Pilot Study**

This project aims to detect early cognitive decline in elderly, through continuous activity measurements from multi-modal sensors that are instrumented in elderly homes. I work together with the

rest of the team to: (i) improve system reliability, so that data is collected reliably from different third-party sensors; (ii) provide system monitoring features, such that any system faults can be detected and rectified as soon as possible; and (iii) perform data analysis, to find correlations and differences from sensor data between the cognitively healthy elderly, and those who suffer from Mild Cognitive Impairment (MCI). Preliminary findings indicate that sensor-derived features of forgetfulness can help to differentiate between the two groups of elderly, i.e., those with MCI and those without.

**SHINESeniors** @ SMU, Singapore (May 2015 - present)

**Smart Homes and Intelligent Neighbours to Enable Seniors**

SHINESeniors aims to enhance healthcare and community caregiver support for the elderly, through the use of unobtrusive in-home monitoring sensor devices. One of the key focus of the project is the use of heterogeneous data sources (such as surveys, observations and sensor data) to provide pre-emptive care, and thereby allowing the elderly to age-in-place. My primary contributions in the project include: (i) architectural co-design and co-development of Starlight, which is a scalable and reliable end-to-end system that has been deployed in approximately 80 elderly residential homes in Singapore, that acquires sensor data from elderly homes and stores them in the backend for further processing and analysis; (ii) medication non-adherence study with over 25 elderly, with positive impact achieved for 2 of these elderly through ground interventions; and (iii) design and implementation of personalized care and response protocols for community caregivers through OTT messaging platforms.

**IDA-JLD** @ I<sup>2</sup>R, Singapore (Dec 2013 - Jun 2015)

**Supply and Delivery of Shared Sensor Network for the Smart & Connected JLD Test-bed**

This project aims to provide a smart testbed across five different sites in the Jurong Lake District (JLD) vicinity in Singapore, through the inter-connection of about two hundred nodes with multi-modal sensing capabilities. My primary role is to provide the architectural design and development of networking protocols to enable bi-directional, multihop data transfer between heterogeneous sensor nodes and the backend server(s). This enables sensor data to be collected securely, and with high reliability, for further data analysis and processing.

**SenseSURF** @ I<sup>2</sup>R, Singapore (Dec 2014 - Mar 2015)

**Wireless Sensor Mesh Networks Test-bed (NCS - I<sup>2</sup>R Joint Lab)**

As the technical lead for SenseSURF, I work closely with a team of researchers to develop a proof-of-concept for the design, development and deployment of: (i) a small-scale wireless sensor mesh network, for both indoor and outdoor monitoring; and (ii) a sensor network management platform to evaluate technology capabilities for future large-scale rollout of a Smart Nation Platform. This research work is done in collaboration with NCS, to complement its vision of a smart, sustainable nation and Solutions for an Urbanised Future (SURF) initiative.

**UNI-SENSE** @ I<sup>2</sup>R, Singapore (Aug 2012 - present)

**Unified and Sustainable Sensing and Transport Architecture for Large Scale and Heterogeneous Sensor Networks**

As part of the Sensor Network Design group, I am involved in designing and developing intelligent networking protocols for large-scale sensor networks. I also look into auxiliary issues, such as adaptive duty cycling and smart site survey tools. In addition, I am the main designer of *UniNet* - a unified networking architecture for scalable, sustainable and robust wireless sensor networks. UniNet has been deployed and tested in indoor and outdoor deployments, such as the WSNoise and IDA-JLD projects.

**WSNoise** @ I<sup>2</sup>R, Singapore (Aug 2012 - Jun 2014)

**Wireless Sensor Networks for Real-time and Continuous Ambient Noise Mapping**

WSNoise focuses on the real-time acquisition of noise sensor readings in outdoor urban environments with highly varying environmental conditions - such as traffic. My primary task is to provide wireless networking capabilities for the 150 sensor nodes that have been deployed across three physical sites - Clementi, Ang Mo Kio and Jurong Lake District - in Singapore. Some key insights that are derived from the project include the identification of timings, locations and causes of high noise volumes in the neighborhoods.

**DTN-AN** @ I<sup>2</sup>R, Singapore (Aug 2012 - May 2014)

**Disruption Tolerant Networking (DTN) for Airborne Networks**

Airborne networks generally suffer from frequent disruptions due to high node mobility, ad hoc connectivity and line-of-sight blockages. This project explores the feasibility of utilizing disruption-tolerant networking techniques to alleviate these challenges. I am the co-designer of GTA-m, a multi-copy greedy trajectory-aware routing protocol for airborne networks that exploits the use of flight information to forward bundles to intended destination(s).

**FUM** @ School of Computing, NUS (Jul 2010 - Aug 2012)

**Improving Future Urban Mobility through ICT**

The Future Urban Mobility (FUM) project is a collaboration with the Singapore-MIT Alliance for Research & Technology (SMART) center. The key objective of FUM is to improve urban transportation systems while enhancing environmental sustainability. As part of my postdoctoral research, I studied efficient communication and resource allocation in vehicular disruption tolerant networks, which can be used in applications such as traffic information dissemination, taxi booking and taxi dispatch systems. In addition, I designed and implemented TaxiGuru on the Android platform, which is a fully distributed system that enhances the taxi hailing process by assisting passengers in locating and reserving free taxis within the vicinity.

**Doctoral Research** @ School of Computing, NUS (Nov 2006 - Dec 2010)

**Communication Protocols for Energy-Constrained Networks**

We identify the caveats of existing networking protocols for energy constrained networks and propose three novel algorithms that provide better energy efficiency: (i) A<sup>2</sup>-MAC - an adaptive, anycast MAC protocol that effectively reduces energy expenditure in generic low-powered wireless sensor networks, by allowing nodes to operate with different duty cycles and forwarding sets; (ii) IQAR - an information quality (IQ) aware routing protocol that finds the least-cost routing tree that satisfies a given IQ constraint when a phenomenon of interest (PoI) occurs in the network; and (iii) IQDEA - an IQ-aware delay efficient aggregation scheme that minimizes PoI detection delays and transmission costs in duty cycled networks while satisfying application-level IQ requirements.

**USCAM-CQ** @ School of Computing, NUS and I<sup>2</sup>R, Singapore (Dec 2006 - Jul 2009)

**UWB-enabled Sentient Computing Architecture and Middleware with Coordinated QoS (USCAM-CQ)**

The USCAM-CQ project is part of the Ultra Wideband-enabled Sentient Computing (UWB-SC) Research Programme funded by A\*STAR. My focus in this project is on communication protocols for UWB networks. The characteristics of the UWB physical layer are studied and implemented in the Qualnet (network) simulator. In addition, we design and implement: (i) a slotted-Aloha MAC protocol over the Time-Hopping (TH) UWB PHY; and (ii) a fair resource allocation over a TH-UWB PHY.

**TRITON** @ I<sup>2</sup>R, Singapore (Mar 2005 - Oct 2006)

**TRI-media Telematic Oceanographic Network (TRITON)**

I was a graduate student attached to this project, which specializes in underwater acoustic sensor network communications. We study the differences between the underwater acoustic environment and terrestrial RF environment, and implement the acoustic environment in the Qualnet (network) simulator. In addition, we design and implement: (i) a MAC protocol that is feasible for use in underwater environments that experience high latencies; and (ii) a distributed CDMA code assignment algorithm for wireless sensor networks.

**Bachelors Research** @ I<sup>2</sup>R, Singapore and School of Computing, NUS (Jan 2004 - Dec 2004)

**Dynamic Adaptation of MANET Routing Protocols**

We first provide an overview of protocol characteristics and a detailed study of network characteristics that can affect the performance of mobile ad hoc network routing protocols. We then propose three adaptive schemes that can be implemented on top of any reactive routing protocol: (i) dynamic adaptation of frequency of broadcasts; (ii) dynamic adaptation of behavior of routing requests and replies, based on link stability; and (iii) dynamic topology control to reduce interference.

## awards

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**Second Prize Winner, Designathon 2017** DesignSingapore Council, 2017

**Bronze A' Design Award in Digital and Electronic Devices Design Category** A' Design Award & Competition, 2015

**The Award for Leading, Educating and Nurturing Talent (TALENT)** A\*STAR, Singapore, 2014

**Outstanding Mentor Award** 20<sup>th</sup> Youth Science Conference, Ministry of Education, Singapore, 2014

**NUS Research Achievement Award** NUS, Singapore, AY 2009/2010

**Best Teaching Assistant Award** NUS, Singapore, AY 2008/2009

**NUS Research Scholarship** NUS, Singapore, Jan 2005 - Dec 2008

## publications

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### White Paper

1. SMU-TCS iCity Lab, *Technologies for Ageing-in-Place: The Singapore Context*, 2016.

### Book Chapter

1. W. K. G. Seah and H. X. Tan, *Quality of Service in Mobile Ad Hoc Networks - Myth or Reality?*, Encyclopedia of Internet Technologies and Applications, 2007.

### Journal Papers

1. J. Kim, N. Liu, H. X. Tan and C. H. Chu, *Unobtrusive Monitoring to Detect Depression for Elderly with Chronic Illnesses*, accepted for publication in IEEE Sensors Journal, 2017.
2. X. Che, S. Maag, H. X. Tan, H. P. Tan and Z. Zhou, *A Passive Testing Approach for Protocols in Wireless Sensor Networks*, Sensors, Special Issue: Identification, Information & Knowledge in the Internet of Things, Vol. 15, No. 11, 2015.
3. W. H. R. Chan, P. Zhang, I. Nevat, S. G. Nagarajan, A. Valera, H. X. Tan and N. Gautam, *Adaptive Duty Cycling in Sensor Networks with Energy Harvesting using Continuous-Time Markov Chain and Fluid Models*, IEEE Journal on Selected Areas in Communications, Vol. 33, No. 12, 2015.
4. H. X. Tan, M. C. Chan, P. Y. Kong and C. K. Tham, *SAUCeR: A QoS-aware Slotted-Aloha based UWB MAC with Cooperative Retransmissions*, Wireless Communications and Mobile Computing (WCMC), Special Issue on "Architectures and Protocols for Wireless Mesh, Ad Hoc, and Sensor Networks", Vol. 11, No. 3, 2011.
5. W. K. G. Seah, L. Y. Yeo, Z. A. Eu, H. X. Tan and K. S. Tan, *Performance Modeling of Mobile Ad Hoc Networks Interconnectivity*, International Journal of Wireless Information Networks (IJWIN), Vol. 13, No. 2, 2006.

### Conference Papers

1. B. T. Ng, H. X. Tan and H. P. Tan, *Managing Sensor Systems for Early Detection of Mild Cognitive Impairment in Community Elderly: Lessons Learned and Future Work*, accepted for publication in IRC-SET, 2017.
2. X. Toh, H. X. Tan, H. Liang and H. P. Tan, *Elderly Medication Adherence with the Internet of Things*, IEEE PerCom Workshop on Pervasive Technologies and care systems for sustainable Aging-in-place (PASTA), 2016.
3. H. X. Tan and H. P. Tan, *Massive Open Online Networks for Urban Sensing: Design, Deployment and Challenges (Invited Paper)*, IEEE VTS APWCS 2015.
4. X. Che, S. Maag, H. X. Tan and H. P. Tan, *Passively Testing Routing Protocols in Wireless Sensor Networks*, UIC 2015.

5. R. Chan, P. Zhang, W. Zhang, I. Nevat, A. C. Valera, H. X. Tan and N. Gautam, *Adaptive Duty Cycling in Sensor Networks via Continuous Time Markov Chain Modelling*, IEEE ICC 2015.
6. J. M. Koh, M. Sak, H. X. Tan, H. Liang, F. Foliato and T. Quek, *Efficient Data Retrieval for Large-Scale Smart City Applications through Applied Bayesian Interference*, IEEE ISSNIP 2015.
7. J. M. Koh, M. Sak, H. X. Tan, H. Liang, F. Foliato and T. Quek, *SensoreM - An Efficient Mobile Platform for Wireless Sensor Network Visualization*, IEEE ISSNIP 2015 (Demo and Video).
8. X. Ma, H. X. Tan and A. C. Valera, *GTA-m: Greedy Trajectory-Aware (m copies) Routing for Airborne Networks*, ACM AIRBORNE 2014.
9. X. Zhang, Y. Jin, H. X. Tan and W. S. Soh, *CIMLoc: A Crowdsourcing Indoor Digital Map Construction System for Localization*, IEEE ISSNIP 2014.
10. D. Thangavel, X. Ma, A. C. Valera, H. X. Tan, C. K. Y. Tan, *Performance Evaluation of MQTT and CoAP via a Common Middleware*, IEEE ISSNIP 2014.
11. H. X. Tan and M. C. Chan, *A<sup>2</sup>-MAC: An Adaptive, Anycast MAC Protocol for Wireless Sensor Networks*, IEEE WCNC 2010.
12. H. X. Tan, M. C. Chan, W. Xiao, P. Y. Kong and C. K. Tham, *Information-Quality Aware Routing in Event-Driven Sensor Networks*, IEEE INFOCOM 2010.
13. J. Tan, M. C. Chan, H. X. Tan, P. Y. Kong and C. K. Tham, *A Medium Access Control Protocol for UWB Sensor Networks with QoS Support*, IEEE LCN 2008.
14. G. Naddafzadeh S., P. Y. Kong, H. X. Tan, R. K. Patro, M. C. Chan and C. K. Tham, *A Resource Allocation Scheme to Achieve Fairness in TH-UWB Sensor Networks with Near-Far Effects*, IEEE PIMRC 2008.
15. H. X. Tan, M. C. Chan, P. Y. Kong and C. K. Tham, *A Resource Allocation Scheme for TH-UWB Networks with Multiple Sinks*, WCNC 2008.
16. H. X. Tan and W. K. G. Seah, *Distributed CDMA-based MAC Protocol for Underwater Sensor Networks*, IEEE LCN 2007.
17. H. X. Tan, R. K. Patro, M. C. Chan, P. Y. Kong and C. K. Tham, *Performance of Slotted-Aloha over TH-UWB*, IEEE ICUWB 2007.
18. W. K. G. Seah and H. X. Tan, *Multipath Virtual Sink Architecture for Underwater Sensor Networks*, MTS/IEEE OCEANS Asia Pacific Conference 2006.
19. H. X. Tan, W. K. G. Seah and K. M. Chan, *Distributed CDMA Code Assignment for Wireless Sensor Networks*, IEEE RWS 2006.
20. H. X. Tan and W. K. G. Seah, *Framework for Statistical Filtering Against DDoS Attacks in MANETs*, ICSS 2005.
21. W. K. G. Seah, H. X. Tan, Z. Liu and Marcelo H. Ang Jr, *Multiple-UUV Approach for Enhancing Connectivity in Underwater Ad-hoc Sensor Networks*, MTS/IEEE OCEANS 2005.
22. H. X. Tan and W. K. G. Seah, *Limiting Control Overheads Based on Link Stability for Improved Performance in Mobile Ad Hoc Networks*, WWIC 2005.
23. H. X. Tan and W. K. G. Seah, *Dynamic Topology Control to Reduce Interference in MANETs*, ICMU 2005.
24. H. X. Tan and W. K. G. Seah, *Dynamically Adapting Mobile Ad Hoc Routing Protocols to Improve Scalability*, IASTED CSN 2004.

I primarily mentor undergraduate students who are interested in the use of Internet of Things (IoT) technologies, to: (i) build smart city applications; and/or (ii) improve the lives of the elderly and less able-bodied, as well as other under-privileged groups. Selected project descriptions are available below.

### IS480 (Final Year Project) Sponsorship @ SMU

**Team Florify (AY17T1)** Many Voluntary Welfare Organizations (VWOs) that serve the ageing population in Singapore adopt a manual and labor-intensive approach for client management. This project aims to build a case management system that can help to optimize processes, as well as provide data analytics to influence potential policy decisions in VWOs, so as to improve the care for the elderly in the community.

**Tetris by Team Tetris (AY16T2)** Team Tetris is aimed at building a tool that allows community caregivers to easily customize alerts for their elderly beneficiaries.

**Nowtify by Team Gemini (AY16T1)** In many eldercare centres, there is usually a very high elderly-to-caregiver ratio. The focus of the project is to prototype and testbed an IoT-based solution that can notify caregivers when the system detects that the elderly are attempting to stand up from their chairs. Nowtify allows caregivers to provide prompt assistance to the elderly, so that falls can be minimized. Nowtify is testbedded at St. Hilda's Community Services Centre.

**WheelRoutes by Team Humblebees (AY16T1)** WheelRoutes is a project that crowd-sources data from wheelchair users using IoT devices, and processes these data into wheelchair accessibility information for the public. This information includes tried-and-tested routes and route quality (i.e. bumpiness, gradient of slope and users' feedback), which will be displayed on Google Maps. WheelRoutes sets the foundation of a larger national initiative that aims to map out the Barrier Free Access routes throughout Singapore.

### IS439 (Internet of Things: Technology and Applications) Undergraduate Course @ SMU

**Team Laundronauts (AY16T2)** Laundronauts uses an IoT-centric system to reduce time wasted by hostel residents when they are doing their laundry. The Laundronauts solution uses a web application that collects data from sensors that are installed on washing machines, that suggest the availability of the washing machines. Hostel residents can thus make informed decisions on when to do their laundry, hence saving both time and effort. This work is accepted for publication in IRC-SET 2017.

**Team SmartJi (AY16T2)** SmartJi aims to increase efficiency of the chicken farm by monitoring and controlling environmental factors – such as temperature, humidity and light levels – to provide chickens with the optimal environment to maximize egg production. SmartJi can also help business owners perform data analysis to better manage farm conditions.

**Team Eye P Man (AY16T1)** Travel independence is seemingly easy for most of us; however, it is one of the biggest challenge to the visually-impaired. EyeKnow, an IoT-based solution, leverages geofencing and beaconing technology to aid them in boarding the right bus. It integrates GPS and open-source APIs to assist users to travel independently and alight at the right stop. EyeKnow has been featured in Channel 8 News 8.

**SupplyWatch by Team Fourster (AY15T2)** Project SupplyWatch uses weight-level sensors to monitor the food consumption levels of food, and thereby bridging the gap between VWOs and their beneficiaries' needs. SupplyWatch has been featured in The Straits Times and TODAY.

**YesterYear by Team Veraque (AY15T1)** Using IoT sensors and data analytics, project YesterYear aims to track elderly activities and behaviors within their houses over a period of time to determine whether they are showing signs of dementia.

**Sparkling Toilets for the Differently-abled by Team SuperBowl (AY15T1)** The project provides hygiene status and occupancy information of handicapped toilets through multi-modal sensors and real-time tracking.

## **ISSS614 (Internet of Things: Technology and Applications) Graduate Course @ SMU**

**Internet of People Analytics (AY16T2)** IoPA is an IoT system that deploys beacons and sensors to capture employee interactions within the working space. The data captured can be married with the existing HR database to provide a rich and detailed profile of employee engagement rates. This allows HR and management teams to improve cultural fit and reduce attrition.

## **Final Year Project (FYP) @ NUS**

**Fusion-based Crowd Density Estimation Using RF Signals (AY13/14)**

**Distributed Sensing Through Mobile Device Ubiquity (AY13/14)**

**Participatory Sensing of Road Environments (AY13/14)**

**Energy-Efficient Relaying in Wireless Sensor Network with Network Coding (AY13/14)**

## **Undergraduate Research Opportunities Program (UROP) @ NUS**

**Urban Sensing through Crowd-sourcing (2013)**

## **Industrial Attachment (IA) Program @ NUS**

**CIMLoc: A Crowdsourcing Indoor Digital Map Construction System for Localization (2013)**

This work is published in IEEE ISSNIP 2014.

## **Vacation Internship Program (VIP) @ NUS**

**SDX: An Android Application for Sensor Network Management (2013)** This work forms the foundation of subsequent R&D work on site survey tools for wireless sensor networks.

**A Study of MQTT and CoAP (2013)** This work is published in IEEE ISSNIP 2014.

## **Industrial Internship Program @ SUTD**

**SUTD Smart Campus Project (2014)** This work resulted in the completion of two mobile applications: (i) Occupancy sensing and visualization through integration with infrastructured sensors; and (ii) Tagline – which allows dynamic interactions between students and lecturers.

## **Zhejiang-SUTD Internship Program @ SUTD**

**Hygiene Level Detection in SUTD (2014)** This work was submitted to the A' Design Award & Competition 2015, and was awarded the Bronze A' Design Award in Digital and Electronic Devices Design Category.

**Indoor Plant Monitoring System (2014)**

## **Science Mentorship Program (SMP) @ NUS High School of Mathematics and Science**

**Enabling Smart Cities Through Wireless Sensing (2014)** This work is published in IEEE ISSNIP 2015 as a conference paper, as well as a demo/video paper. In addition, I received the Outstanding Mentor Award at the 20<sup>th</sup> Youth Science Conference. One of the students (Jin Ming KOH) has also received the valedictorian award at the A\*STAR scholarship awards ceremony 2017.

## **professional experience**

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**Senior Research Scientist @ SMU-TCS iCity Lab, School of Information Systems, SMU, Singapore**

Jul 2015 - present

**Course Instructor @ School of Information Systems, SMU, Singapore**

Jan 2017

- ISSS614 Internet of Things: Technology and Applications

Aug 2015 - present

- IS439 Internet of Things: Technology and Applications

**Scientist I/II @ Sense and Sense-abilities (S&S) Program, I<sup>2</sup>R, A\*STAR, Singapore**

Aug 2012 - Jul 2015

**Research Fellow @ School of Computing, NUS, Singapore**

Jun 2011 - Aug 2012

**Visiting Scholar** @ MIT CSAIL, Massachusetts, USA

Sep 2011 - Dec 2011

**Research Assistant/Associate** @ School of Computing, NUS, Singapore

Jul 2010 - May 2011

**Teaching Assistant** @ School of Computing, NUS, Singapore

Jan 2009 - Jun 2010

- CS2100 Computer Organization  
[AY2008/2009 Sem II](#) - avg score: 4.384 (dept avg: 3.914), 6 nominations for best teaching  
[AY2007/2008 Sem II](#) - avg score: 4.147 (dept avg: 3.885)
- CS2105 Introduction to Computer Networks  
[AY2009/2010 Sem II](#) - avg score: 4.385 (dept avg: 3.831), 10 nominations for best teaching  
[AY2009/2010 Sem I](#) - avg score: 4.443 (dept avg: 3.948), 9 nominations for best teaching
- CS2106 Operating Systems  
[AY2005/2006 Sem II](#) - avg score: 3.973 (dept avg: 3.943)
- CS3103 Computer Networks and Protocols  
[AY2008/2009 Sem I](#) - avg score: 4.595 (dept avg: 3.911)

## professional affiliations and activities

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### Invited Talks

**2016 Winter Technical Training @ Korea Tech** Hands-on Trainer on IoT/IoE

**We Build LIVE Episode 36** Live podcast chat on '[Wireless Technologies](#)'

**12<sup>th</sup> Asia Conference on Pensions and Retirement Planning** Talk on 'Technologies to Enhance Quality of Life in An Ageing Society'

**Young Tech Makers' Fest @ Innova Junior College** Workshop Trainer on 'The Internet of Things'

**Hackware v0.7 Meetup** Sharing Session on '[Lessons from Large-Scale Wireless Sensor Network Deployments](#)'

### Conference Organization

**IEEE ICNP 2016** Publications Chair

**IEEE ISSNIP 2015** Finance Co-coordinator

**IEEE ISSNIP 2014** Local Organizing Co-coordinator

**ICM Horizons 2014** Co-Emcee

**Singapore Brunei Youth Leadership Exchange Programme (SBYLEP) 2016** Singapore delegate

**Singapore Science and Engineering Fair (SSEF) Judge** 2013 - 2015

**Singapore National Science Challenge (NSC) Judge** 2013 (Outdoor Challenge)

**IEEE Member** 2012 - present

**IEEE Student Member** 2008 - 2011

**TPC Member** IEEE PIMRC 2012 (MAC), IEEE ISSNIP 2014 (Sustainable and Adaptive Sensor Networks)

**Ad Hoc Reviewer** IEEE JSAC, IEEE TPDS, Transactions on Mobile Computing, Computer Communications, Networking Science

## technical skills

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**Programming Languages** Python, C/C++, Java, Scheme, Pascal

**Platforms, Frameworks, Tools & Libraries** Django, Pandas, Matplotlib, Arduino, Raspberry Pi, Linux

**Network Simulators** Qualnet, GloMoSim

**Others**  $\LaTeX$



## languages

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**English** Fluent

**Chinese** Fluent

**Japanese** Basic (JLPT 4)

## referees

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**Hwee-Pink Tan**, Ph.D.

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**Winston Seah**, Dr. Eng

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Vice President, Trampoline  
Scientist II, Social & Cognitive Computing (SCC)  
Institute of High Performance Computing (IHPC)  
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