Kok Yew Ng (Mark Ng)

Personal & Contact Information

Nationality:	Malaysian
Research Website:	`http://www.markusng.com`

Research Interests

Fault diagnosis, mathematical modelling, control systems, anomaly detection and classification

Education

Ph.D., Control Engineering and Fault Diagnosis   2009
Monash University, Australia
Thesis: "Advancements In Robust Fault Reconstruction Using Sliding Mode Observers"
Supervisor: Assoc. Prof. Tan Chee Pin (School of Engineering, Monash University, Malaysia)

BEng (Hons), Electrical and Computer Systems Engineering   2006
Monash University, Australia

Current Employment and Affiliations

Senior Lecturer (Mechatronics Engineering and Control)   Oct, 2021–Present
Leader of the Control Engineering and Industrie 4.0 Laboratory
Leader of the COVID-19 Modelling and Forecast Task Force

Lecturer (Mechatronics Engineering and Control)   June, 2017–Sep, 2021
Ulster University, U.K.
I am the Module Coordinator Control Engineering related modules taught to undergraduate and postgraduate students:
- EEE526 Mechatronics 1, 2017–Present.
- EEE316 Control Theory and Applications, 2018–Present.
- EEE838 Advanced Automation and Control, Commencing 2021.
- EEE607 Control for Mechanical Engineers, Commencing 2021.

Research wise, I am attached to the Nanotechnology and Integrated BioEngineering Centre (NIBEC) at the Jordanstown Campus, where I lead the Mechatronics and Control Research Group, working mainly on the control and anomaly detection of mechatronic systems, Industry 4.0, as well as biomedical and healthcare related applications.

I am also a co-investigator in SAFEWATER, a £5 million project funded by GCRF, where I lead the development and the optimisation of embedded algorithms in the SAFEWATER project. These embedded algorithms will be used for controlling the low-cost water disinfection technologies that are being developed during the SAFEWATER project.

I am a Senior Member of the IEEE and I am currently a Committee Member of the IEEE Control Systems Society (CSS) UK and Ireland Chapter. I am Associate Editor for *IEEE Access* and an Editor for *PeerJ Computer Science*. I am also a Moderator for *IEEE TechRxiv*.

During the COVID-19 pandemic, I lead the Modelling and Forecast Task Force at Ulster

University where we work very closely with the Southern Health and Social Care Trust to provide analysis to the Governments Specialist Modelling Response Expert Group in Northern Ireland. The main purpose of the project is to validate and inform the Modelling Response Team's work as well as help governing bodies in Northern Ireland to better plan for intervention measures and ultimately flatten the curve. I am also a member of the COVID-19 Task Force set up by the IEEE Region 8 community. In addition, I lead a team of researchers and data scientists from Ulster and Queen's University Belfast to work with the Incident Controller for the State Health Incident Control Centre and Chief Health Officer of the Department of Health in Western Australia to model the outbreak of COVID-19 on commercial cargo vessels.

Adjunct Senior Research Fellow   **June, 2017–Present**
School of Engineering, Monash University, Malaysia

PAST EMPLOYMENTS AND AFFILIATIONS
Senior Lecturer   **Jan, 2016–June, 2017**
Lecturer   **July, 2009–Dec, 2015**
School of Engineering, Monash University, Malaysia
I was responsible as the coordinator of a few units related to Control Engineering for various disciplines offered at the campus. I developed a new unit, ECE3062 Electronic Systems and Control, which is offered at both Monash University Malaysia and Australia campuses. I was an active researcher especially in the area of Fault Diagnosis with quality publications in international peer-reviewed journal articles, including the prestigious *Automatica* and *IEEE Transactions on Automatic Control*. I also conducted trainings and was involved in a few consulting projects with the industry. I was the coordinator for the following units:
  • ECE2061 Analogue Circuits, 2016–2017.
  • ECE2031 Circuits & Control, 2015.
  • ECE3062 Electronic Systems & Control (a unit I developed for Monash), 2011–2013.
  • ENG1030 Electrical Systems, 2011–2013.
  • ECE2021 Electromagnetism, 2010–2012, 2015–2016.
  • MEC3457 Systems and Control, 2010–2011.
  • ECE3031 Control Systems, 2010.
  • ENG1020 Engineering Structures, 2009.
  • ENG1060 Computing for Engineers, 2006–2009.

Postdoctoral Fellow   **Jan–Mar, 2016**
Linköping University and Volvo Car Corporation, Sweden
Collaborators: Prof. Erik Frisk, Assoc. Prof. Mattias Krysander, and Dr Daniel Jung
I continued to work on the project described under my position as a Postdoctoral Fellow with the same institution. Besides further developing the FI scheme on paper and via simulations, the project also progressed to the testing of the designed FI schemes onto the actual engine in the Engine Lab via the dSPACE control system.

Postdoctoral Fellow   **May, 2014–May, 2015**
Linköping University and Volvo Car Corporation, Sweden
Supervisor: Prof. Erik Frisk
I was based at the Division of Vehicular Systems (FS) headed by Prof. Lars Nielsen at Linköping University, Sweden, where I worked on Fault Diagnosis of Single-Turbocharged Gasoline Engine with Volvo Car Corporation (VOLVO) using both model-based and data-driven methods.

I also developed the GUI-based Simulation Environment on Matlab and Simulink used by

Volvo for the following:
- Realistic modelling and control of the engine
- Injection and realistic simulations of a variety of actuator, sensor and variable faults in the engine
- In-house designed algorithm for additional residuals selection
- In-house designed algorithms for alarm generations, residuals monitoring as well as Fault Isolation (FI)
- Simulation and FI of system with intermittent residuals

Graduate Student   **Apr, 2006–Apr, 2009**
Ph.D. research and teaching support.

HONOURS AND AWARDS

Learning and Teaching Award, Ulster University Students' Union, 2020

Erasmus+ Staff Mobility Program, 2018

Monash University Malaysia PVC's Award for Excellence in Research, Round 1, 2012

Letter of Commendation for Excellence Unit Evaluation Result from the Associate-Dean (Education), Faculty of Engineering, Monash University Australia, 2012

Top 50 Best Units Offered by Faculty of Engineering (ranked #22) Across All Campuses of Monash University, 2010

Monash University Malaysia PVC's Award for Excellence in Teaching, Round 2, 2011

Monash University Malaysia PVC's Award for Excellence in Teaching, Round 1, 2011

Monash University Malaysia PVC's Award for Excellence in Teaching, Round 2, 2010

Monash University Malaysia PVC's Award for Excellence in Teaching, Round 1, 2010

Monash University Malaysia PVC's Award for Excellence in Teaching, Round 2, 2009

Higher Degree by Research Scholarship for Ph.D. in Engineering, 2007

Postgraduate Research Scholarship for Master of Engineering Science by Research, 2006

Monash University Malaysia Entrance Scholarship, 2002

SCHOLARLY PUBLICATIONS

International Peer-Reviewed Journals

[1] P. Biglarbeigi, **K. Y. Ng**, D. Finlay, R. Bond, M. Jing, and J. McLaughlin, "Sensitivity analysis of the infection transmissibility in the UK during the COVID-19 pandemic," *PeerJ*, vol. 9, e10992, 2021. DOI: 10.7717/peerj.10992. [Online]. Available: https://pure.ulster.ac.uk/en/publications/sensitivity-analysis-of-the-infection-transmissibility-in-the-uk-.

[2] T. D. Do, M. M. Gui, and **K. Y. Ng**, "Assessing the effects of time-dependent restrictions and control actions to flatten the curve of COVID-19 in Kazakhstan," *PeerJ*, vol. 9, e10806, 2021. DOI: `10.7717/peerj.10806`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/assessing-the-effects-of-time-dependent-restrictions-and-control-`.

[3] M. Jing, **K. Y. Ng**, B. MacNamee, *et al.*, "COVID-19 Modelling by Time-varying Transmission Rate Associated with Mobility Trend of Driving via Apple Maps," *Journal of Biomedical Informatics*, p. 103905, 2021. DOI: `10.1016/j.jbi.2021.103905`. [Online]. Available: `https://www.sciencedirect.com/science/article/pii/S1532046421002343`.

[4] L. J. Robertson, J. S. Moore, K. Blighe, *et al.*, "Evaluation of the IgG antibody response to SARS CoV-2 infection and performance of a lateral flow immunoassay: cross-sectional and longitudinal analysis over 11 months," *BMJ Open*, vol. 11, no. 6, e048142, 2021, ISSN: 2044-6055. DOI: `10.1136/bmjopen-2020-048142`. [Online]. Available: `https://bmjopen.bmj.com/content/11/6/e048142`.

[5] **K. Y. Ng**, E. Frisk, M. Krysander, and L. Eriksson, "A Realistic Simulation Testbed of a Turbocharged Spark-Ignited Engine System: A Platform for the Evaluation of Fault Diagnosis Algorithms and Strategies," *IEEE Control Systems Magazine*, vol. 40, pp. 56–83, 2 2020. DOI: `10.1109/MCS.2019.2961793`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/a-realistic-simulation-testbed-of-a-turbocharged-spark-ignited-en`.

[6] **K. Y. Ng** and M. M. Gui, "COVID-19: Development of a robust mathematical model and simulation package with consideration for ageing population and time delay for control action and resusceptibility," *Physica D: Nonlinear Phenomena*, vol. 411, p. 132599, 2020. DOI: `10.1016/j.physd.2020.132599`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/covid-19-development-of-a-robust-mathematical-model-and-simulatio`.

[7] D. Jung, **K. Y. Ng**, E. Frisk, and M. Krysander, "Combining model-based diagnosis and data-driven anomaly classifiers for fault isolation," *Control Engineering Practice*, vol. 80, pp. 146–156, 2018. DOI: `10.1016/j.conengprac.2018.08.013`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/combining-model-based-diagnosis-and-data-driven-anomaly-classifie`.

[8] L. H. Lee, T. Y. Wu, K. P. Y. Shak, *et al.*, "Sustainable approach to biotransform industrial sludge into organic fertilizer via vermicomposting: A mini-review," *Journal of Chemical Technology & Biotechnology*, vol. 93, no. 4, pp. 925–935, 2018. DOI: `10.1002/jctb.5490`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/sustainable-approach-to-biotransform-industrial-sludge-into-organ`.

[9] S. J. W. Tang, V. Kalavally, **K. Y. Ng**, C. P. Tan, and J. Parkkinen, "Real-Time Closed-Loop Color Control of a Multi-Channel Luminaire Using Sensors Onboard a Mobile Device," *IEEE Access*, vol. 6, pp. 54751–54759, 2018. DOI: `10.1109/ACCESS.2018.2872320`.

[10] J. H. T. Ooi, C. P. Tan, S. Nurzaman, and **K. Y. Ng**, "A Sliding Mode Observer for Infinitely Unobservable Descriptor Systems," *IEEE Transactions on Automatic Control*, vol. 62, no. 7, pp. 3580–3587, 2017. DOI: `10.1109/TAC.2017.2665699`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/a-sliding-mode-observer-for-infinitely-unobservable-descriptor-sy`.

[11] S. Tang, V. Kalavally, **K. Y. Ng**, and J. Parkkinen, "Development of a prototype smart home intelligent lighting control architecture using sensors onboard a mobile computing system," *Energy and Buildings*, vol. 138, pp. 368–376, 2017. DOI: `10.1016/j.enbuild.2016.12.069`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/development-of-a-prototype-smart-home-intelligent-lighting-contro`.

[12] J. Y. Ng, C. P. Tan, H. Trinh, and **K. Y. Ng**, "A common functional observer scheme for three systems with unknown inputs," *Journal of the Franklin Institute*, vol. 353, no. 10, pp. 2237–2257, 2016. DOI: `10.1016/j.jfranklin.2016.03.020`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/a-common-functional-observer-scheme-for-three-systems-with-unknow`.

[13] J. Y. Ng, C. P. Tan, **K. Y. Ng**, and H. Trinh, "New results in common functional state estimation for two linear systems with unknown inputs," *International Journal of Control, Automation and Systems*, vol. 13, no. 6, pp. 1538–1543, 2015. DOI: `10.1007/s12555-014-0315-x`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/new-results-in-common-functional-state-estimation-for-two-linear-`.

[14] J. H. T. Ooi, C. P. Tan, and **K. Y. Ng**, "State and Fault Estimation For Infinitely Unobservable Descriptor Systems Using Sliding Mode Observers," *Asian Journal of Control*, vol. 17, no. 4, pp. 1458–1461, 2015. DOI: `10.1002/asjc.1033`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/state-and-fault-estimation-for-infinitely-unobservable-descriptor`.

[15] C. Y. Kee, C. P. Tan, **K. Y. Ng**, and H. Trinh, "New results in robust functional state estimation using two sliding mode observers in cascade," *International Journal of Robust and Nonlinear Control*, vol. 24, no. 15, pp. 2079–2097, 2014. DOI: `10.1002/rnc.2973`.

[16] **K. Y. Ng**, C. P. Tan, and D. Oetomo, "Disturbance decoupled fault reconstruction using cascaded sliding mode observers," *Automatica*, vol. 48, no. 5, pp. 794–799, 2012. DOI: `10.1016/j.automatica.2012.02.005`.

[17] **K. Y. Ng**, C. P. Tan, R. Akmeliawati, and C. Edwards, "Disturbance decoupled fault reconstruction using sliding mode observers," *Asian Journal of Control*, vol. 12, no. 5, pp. 656–660, 2010. DOI: `10.1002/asjc.231`.

[18] **K. Y. Ng**, C. P. Tan, Z. Man, and R. Akmeliawati, "New results in disturbance decoupled fault reconstruction in linear uncertain systems using two sliding mode observers in cascade," *International Journal of Control, Automation and Systems*, vol. 8, no. 3, pp. 506–518, 2010. DOI: `10.1007/s12555-010-0303-8`.

[19] **K. Y. Ng**, C. P. Tan, C. Edwards, and Y. C. Kuang, "New results in robust actuator fault reconstruction for linear uncertain systems using sliding mode observers," *International Journal of Robust and Nonlinear Control*, vol. 17, no. 14, pp. 1294–1319, 2007. DOI: `10.1002/rnc.1170`.

Conference Proceedings

[1] N. McCallan, S. Davidson, **K. Y. Ng**, P. Biglarbeigi, D. Finlay, B. L. Lan, and J. McLaughlin, "Seizure Classification of EEG based on Wavelet Signal Denoising Using a Novel Channel Selection Algorithm," in *13th Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC) (In press)*, 2021.

[2] **K. Y. Ng**, E. Frisk, and M. Krysander, "Design and Selection of Additional Residuals to Enhance Fault Isolation of a Turbocharged Spark Ignited Engine System*," in *2020 7th International Conference on Control, Decision and Information Technologies (CoDIT)*, vol. 1, 2020, pp. 76–81. DOI: `10.1109/CoDIT49905.2020.9263792`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/design-and-selection-of-additional-residuals-to-enhance-fault-iso`.

[3] N. McCallan, D. Finlay, P. Biglarbeigi, G. Perpiñan, M. Jennings, **K. Y. Ng**, J. McLaughlin, and O. Escalona, "Wearable Technology: Signal Recovery of Electrocardiogram From Short Spaced Leads in the Far-Field Using Discrete Wavelet Transform Based Techniques," in *2019 Computing in Cardiology (CinC)*, 2019, Page 1–Page 4. DOI: `10.23919/CinC49843.2019.9005868`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/wearable-technology-signal-recovery-of-electrocardiogram-from-sho`.

[4] P. Biglarbeigi, D. McLaughlin, K. Rjoob, Abdullah, N. McCallan, A. Jasinska-Piadlo, R. Bond, D. Finlay, **K. Y. Ng**, A. Kennedy, and J. McLaughlin, "Early Prediction of Sepsis Considering Early Warning Scoring Systems," in *2019 Computing in Cardiology (CinC)*, 2019, Page 1–Page 4. DOI: `10.23919/CinC49843.2019.9005630`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/early-prediction-of-sepsis-considering-early-warning-scoring-syst`.

[5] D. Jung, **K. Y. Ng**, E. Frisk, and M. Krysander, "A combined diagnosis system design using model-based and data-driven methods," in *2016 3rd Conference on Control and Fault-Tolerant Systems (SysTol)*, 2016, pp. 177–182. DOI: `10.1109/SYSTOL.2016.7739747`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/a-combined-diagnosis-system-design-using-model-based-and-data-dri`.

[6] W. J. Lee, **K. Y. Ng**, C. L. Tan, and C. P. Tan, "Real-time face detection and motorized tracking using ScicosLab and SMCube on SoC's," in *2016 14th International Conference on Control, Automation, Robotics and Vision (ICARCV)*, 2016, pp. 1–6. DOI: `10.1109/ICARCV.2016.7838614`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/real-time-face-detection-and-motorized-tracking-using-scicoslab-a`.

[7] S. J. W. Tang, **K. Y. Ng**, V. Kalavally, and J. Parkkinen, "Closed-loop color control of an RGB luminaire using sensors onboard a mobile computing system," in *2016 IEEE Student Conference on Research and Development (SCOReD)*, 2016, pp. 1–5. DOI: `10.1109/SCORED.2016.7810062`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/closed-loop-color-control-of-an-rgb-luminaire-using-sensors-onboa`.

[8] W. C. Chew, **K. Y. Ng**, and B. H. Khoo, "ReCon-AVe: Remote Controlled Automobile Vehicle for Data Mining and Analysis," in *2015 IEEE 39th Annual Computer Software and Applications Conference*, vol. 2, 2015, pp. 569–574. DOI: `10.1109/COMPSAC.2015.170`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/recon-ave-remote-controlled-automobile-vehicle-for-data-mining-an-2`.

[9] S. J. W. Tang, **K. Y. Ng**, B. H. Khoo, and J. Parkkinen, "Real-Time Lane Detection and Rear-End Collision Warning System on a Mobile Computing Platform," in *2015 IEEE 39th Annual Computer Software and Applications Conference*, vol. 2, 2015, pp. 563–568. DOI: `10.1109/COMPSAC.2015.171`. [Online]. Available: `https://pure.ulster.ac.uk/en/publications/real-time-lane-detection-and-rear-end-collision-warning-system-on-2`.

[10] **K. Y. Ng**, C. P. Tan, and D. Oetomo, "Enhanced fault reconstruction using cascaded sliding mode observers," in *2012 12th International Workshop on Variable Structure Systems*, 2012, pp. 208–213. DOI: `10.1109/VSS.2012.6163503`.

[11] C. Fernandes, **K. Y. Ng**, and B. H. Khoo, "Development of a convenient wireless control of an autonomous vehicle using apple iOS SDK," in *TENCON 2011 - 2011 IEEE Region 10 Conference*, 2011, pp. 1025–1029. DOI: 10.1109/TENCON.2011.6129266.

[12] **K. Y. Ng** and C. P. Tan, "New results in disturbance decoupled fault reconstruction in linear uncertain systems using two sliding mode observers in cascade," in *7th IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes*, vol. 42, 2009, pp. 780–785. DOI: 10.3182/20090630-4-ES-2003.00128.

[13] **K. Y. Ng**, C. P. Tan, R. Akmeliawati, and C. Edwards, "Disturbance Decoupled Fault Reconstruction using Sliding Mode Observers," in *17th IFAC World Congress*, vol. 41, 2008, pp. 7215–7220. DOI: 10.3182/20080706-5-KR-1001.01221.

[14] **K. Y. Ng**, C. P. Tan, C. Edwards, and Y. C. Kuang, "New result in robust actuator fault reconstruction with application to an aircraft," in *2007 IEEE International Conference on Control Applications*, 2007, pp. 801–806. DOI: 10.1109/CCA.2007.4389331.

[15] **K. Y. Ng**, C. P. Tan, and R. Akmeliawati, "Tolerance towards sensor failures: an application to a double inverted pendulum," in *Third IEEE International Workshop on Electronic Design, Test and Applications (DELTA'06)*, 2006, 6 pp.–434. DOI: 10.1109/DELTA.2006.92.

Others

[1] **K. Y. Ng**, "Design and Development of A Simulation Environment and A Fault Isolation Scheme on A Volvo VEP4 MP Engine," Research and Development Centre, Volvo Car Corporation, Gothenburg, Sweden, Tech. Rep., 2015.

[2] ——, "Advancements in robust fault reconstruction using sliding mode observers," Ph.D. dissertation, Monash University, 2009. DOI: 10.4225/03/587c001b22509.

GRANTS

Monash University Malaysia-ASEAN Sustainable Development Research Grant Scheme
2020
Co-investigator MYR980,000
Genomic variations and association study of agronomic traits in Malaysia, Myanmar and Thailand weedy rice (*Oryza sativa* L.)

Global Challenges Research Fund (GCRF), UK 2018
Co-investigator GBP4,889,812
Low cost technologies for safe drinking water in developing regions (SAFEWATER)

Erasmus+ Staff Mobility Programme 2018
Principal Investigator GBP934.45
Visiting academic to the Faculty of Electrical Engineering and Autonomous Vehicle Research Team, Augsburg University of Applied Sciences (UAS), Germany with the delivery of lectures and research seminars, as well as establishing new research collaborations with UAS

NVIDIA GPU Grant Programme 2018
Principal Investigator GBP500
Recipient of a Jetson TX2 Developer Kit by NVIDIA to study the use of machine learning algorithms in control systems

Volvo Car Corporation, Gothenburg, Sweden   2015
Co-investigator   SEK960,000
Design and Development of A Simulation Environment and A Fault Isolation Scheme on A
Volvo VEP4 MP Engine

Industrial Collaboration with ItraMAS Corporation Malaysia   2013
Principal Investigator   MYR50,000
Mobile Control of Intelligent Lighting Systems

Monash University Malaysia   2012
Principal Investigator   MYR55,000
Application of Sliding Mode Observer for Fault Diagnosis on A Robotic System

Fundamental Research Grant Scheme, Ministry of Higher Education, Malaysia   2010
Co-investigator   MYR30,000
Development of Common Observer Schemes Using Sliding Mode Techniques For Robust
State Estimation And Fault Detection And Isolation

Monash University Malaysia   2010
Principal Investigator   MYR35,000
Embedded Mathematical, Simulation and Control Application on Mobile Computing Plat-
form

*GBP1 $\approx$ MYR5.80, SEK11.74 as of October 27, 2021

INVITED LECTURES/SEMINARS/PANELS
"Engineering in Medical and Healthcare",
School of Mechanical, Aerospace and Automotive Engineering, Coventry University, UK,
2020.

"A Realistic Simulation Testbed of A Vehicular Engine System — A Platform To Evaluate
Fault Diagnosis Strategies",
School of Engineering Research Seminar Series, Ulster University, Jordanstown Campus,
UK, 2019.

Panel Discussion on "Robots and Automated Systems",
IET NI Robotics League, Ulster University, Belfast, UK, 2019.

"A Turbocharged Petrol Engine System as a Simulation Benchmark Model for Fault Diag-
nosis",
Faculty of Electrical Engineering and Autonomous Vehicle Research Team, Augsburg Uni-
versity of Applied Sciences, Germany, 2018.

"Design and Development of A Fault Isolation Scheme on A Vehicular Engine System",
Faculty of Electrical Engineering and Autonomous Vehicle Research Team, Augsburg Uni-
versity of Applied Sciences, Germany, 2018.

"Beyond Calls and Games: Utilising The Full Potentials of Smartphones",
TEDx Sunway University: The Untold Ideas, Malaysia, 2017

"Design and Development of a Simulation Environment and a Fault Isolation Scheme on A
Vehicular Engine System",

Centre for Automotive Research, National University of Malaysia, Malaysia, 2016

"Using Monoscopic Camera on A Smartphone For Real-Time Lane Detection and Rear-End Collision Warning",
Machine Vision and Pattern Recognition Laboratory (MVPR), Lapeenranta University of Technology, Finland, 2015

"Real-Time Lane Detection and Rear-End Collision Warning System on A Mobile Computing Platform",
Computer Science School of Computing, University of Eastern Finland, Finland, 2015

"Robust Fault Diagnosis Using Sliding Mode Observers",
Division of Vehicular Systems, Linköping University, Sweden, 2014

"Robust Fault Reconstruction Using Sliding Mode Observers and Real-Time Image Processing on A Mobile Device",
Department of Electrical, Electronic & Systems Engineering, National University of Malaysia, Malaysia, 2014

"Disturbance Decoupled Fault Reconstruction Using Multiple Sliding Mode Observers",
Department of Telecommunications, Electrical, Robotics and Biomedical Engineering, Swinburne University of Technology, Australia, 2012

"Fault Reconstruction Using Sliding Mode Observer: Application To An Aircraft",
National Defence University of Malaysia, Malaysia, 2011

"Robust Fault Reconstruction Scheme Using Sliding Mode Observers In Cascade",
School of Engineering, Deakin University, Australia, 2010

OTHER RESEARCH ACTIVITIES

Design of Control Systems, Fault Detection and Diagnosis Schemes, Data Analytics Using Machine Learning and Deep Learning for Applications in Industrial Internet-of-Things (IIoT) and Industry 4.0 (collaboration with Faculty of Electrical Engineering and Autonomous Vehicle Research Team, Augsburg University of Applied Sciences, Germany)

Design and Development of A Fault Tolerant Scheme on An Autonomous Vehicle (collaboration with Faculty of Electrical Engineering and Autonomous Vehicle Research Team, Augsburg University of Applied Sciences, Germany)

Identification and Classification of Multiple Weed Rice Species Using Mobile Computing (collaboration with Assoc. Prof. Beng Kah Song, School of Science, Monash University, Malaysia)

Team leader on Mobile Control of Intelligent Lighting Systems (collaboration with ItraMAS Corporation Malaysia. Completed 2018.)

PROFESSIONAL SERVICES

Reviewer for Fundings
- Newton Fund

Editorial Board of Journals and Committee Membership of Conferences

- Associate Editor, *IEEE Access* (IEEE)
- Moderator, *IEEE TechRxiv* (IEEE)
- Editor, *PeerJ Computer Science* (PeerJ)
- Lead Guest Editor, Special Issue on "Smart Homes: A Prospective of Sensing, Communication, and Automation", *Sensors (MDPI)*
- Program Committee Member, *7th International Conference on Control, Decision and Information Technologies (CoDIT'20)*, Prague, Czech Republic
- Organising Committee Member, *International Conference on Recent Innovations in Engineering and Technology (ICRIET-20)*, Melbourne, Australia
- Co-Chair of Registration, *International Conference on Intelligent Robotics, Automation and Manufacturing 2012 (IRAM 2012)*, Kuala Lumpur, Malaysia

Reviewer for International Peer-Reviewed Journals
- *Automatica* (Elsevier)
- *IEEE Transactions on Industrial Electronics (TIE)* (IEEE)
- *IEEE Transactions on Instrumentation and Measurement (TIM)* (IEEE)
- *IEEE Journal of Biomedical and Health Informatics (JBHI)* (IEEE)
- *IEEE Access* (IEEE)
- *International Journal of Robust and Nonlinear Control (IJRNC)* (Wiley)
- *Control Engineering Practice (CONENGPRAC)* (Elsevier)
- *European Journal of Control (EJCON)* (Elsevier)
- *Asian Journal of Control (AJC)* (Wiley)
- *Computers and Electrical Engineering (COMPELECENG)* (Elsevier)
- *Sensors* (MDPI)
- *Applied Sciences* (MDPI)
- *Circuits, Systems and Signal Processing (CSSP)* (Springer)
- *Building Simulation* (Springer)
- *International Journal of Applied and Computational Mathematics (IACM)* (Springer)
- *International Journal of Advanced Robotic Systems (IJARS)* (SAGE)
- *International Journal of Robotics and Automation (IJRA)* (ACTA Press)
- *International Journal of Control (IJC)* (Taylor & Francis)
- *Australian Journal of Electrical and Electronics Engineering (AJEEE)* (Taylor & Francis)
- *International Journal of Intelligent Unmanned Systems* (Emerald)

Examiner of Postgraduate Students (University, Number of Students Examined)
- Deakin University, Australia (5)

Committees and Professional Affiliations
- Committee Member, UK and Ireland Chapter, IEEE Control Systems Society (CSS)
- Fellow, Higher Education Academy UK (2018–Present)
- Senior Member, IEEE
- Member, IEEE Systems Council
- Member, IEEE Young Professionals
- Member, IEEE Council on Electronic Design Automation
- Member, IEEE Big Data Community
- Member, IEEE Internet of Things Community
- Member, IEEE Vehicular Technology Society Technical Community on Big Data
- Member, IEEE Vehicular Technology Society Technical Community on Cloud Computing
- Member, IEEE Vehicular Technology Society Technical Community on Connected Vehicles
- Member, IEEE Vehicular Technology Society Technical Community on Pattern Analysis and Machine Intelligence

- Auditor, IEEE Robotics and Automation Society (RAS) Malaysia Chapter (2010 & 2011)
- Graduate Member, Board of Engineers Malaysia (BEM)
- Representative from School of Engineering, Campus Review Panel for Higher Degree by Research Course (Monash University Malaysia, 2011)

SUPERVISION OF RESEARCH STUDENTS

- Ms Stefanie Wucherer (German)
  - Project Title: Developing a hybrid model and supervised learning approach for automated handling tasks using tactile feedback
  - Institution: Ulster University, UK in collaboration with Augsburg University of Applied Sciences, Germany (MoU collaboration)
  - Supervision type: First supervisor
  - Candidature: Ph.D. (Ongoing)

- Mr Will Aston (British)
  - Project Title: Industrialised manufacturing processes for 3D printable biomedical sensor devices
  - Institution: Ulster University, UK
  - Supervision type: Joint supervisor
  - Candidature: Ph.D. (Ongoing)

- Mr Scot Davidson (British)
  - Project Title: Advancements in the Study of Using Machine Learning for Abnormalities Detection and Classification of Biomedical Signals
  - Institution: Ulster University, UK
  - Supervision type: First supervisor
  - Candidature: Ph.D. (Ongoing)

- Miss Niamh McCallan (British)
  - Project Title: Advancements in Detection and Classification of Anomalies in Multidimensional Biomedical Signals Using Data-Driven Techniques
  - Institution: Ulster University, UK
  - Supervision type: First supervisor
  - Candidature: Ph.D. (Ongoing)

- Mr Towfeeq Fairooz (Iranian)
  - Project Title: Assessing the role of deep-learning in image-analysis of biosensing colour changing elements
  - Institution: Ulster University, UK
  - Supervision type: Joint supervisor
  - Candidature: Ph.D. (Ongoing)

- Mr Da Yi Lee (Malaysian)
  - Project Title: Genome-Wide Association Mapping and Phenotyping for Agronomic Traits in Malaysian Weedy Rice (*Oryza* sativa)
  - Institution: Monash University, Malaysia
  - Supervision type: Joint supervisor
  - Candidature: Masters by Research (Ongoing)

- Mr Leong Hwee Lee (Malaysian)
  - Project Title: Vermicomposting of Wastewater Sludge Produced from the Treatment

Pond of Palm Oil Mill Effluent
- Institution: Monash University, Malaysia
- Supervision type: Joint supervisor
- Candidature: Ph.D. (Completed, 2018)

○ Mr Samuel Jia Wei Tang (Malaysian)
- Project Title: Intelligent Lighting Control System Using Mobile Computing Devices (a collaboration with ItraMAS Corporation)
- Institution: Monash University, Malaysia
- Supervision type: First supervisor
- Candidature: Masters by Research (Completed, 2018)

○ Mr Jiunn Yea Ng (Malaysian)
- Project Title: Development of Common Observer Schemes using Sliding Mode Observers for Robust State Estimation and Fault Detection and Isolation
- Institution: Monash University, Malaysia
- Supervision type: Joint supervisor
- Candidature: Ph.D. (Completed, 2016)

○ Mr Jeremy Hor Teong Ooi (Malaysian)
- Project Title: Fault Reconstruction using Sliding Mode Observers for Descriptor Systems
- Institution: Monash University, Malaysia
- Supervision type: Joint supervisor
- Candidature: Ph.D. (Completed, 2015)

○ Ms Chew Yee Kee (Malaysian)
- Project Title: Development of Sliding Mode Functional Observer Schemes
- Institution: Monash University, Malaysia
- Supervision type: Joint supervisor
- Candidature: Ph.D. (Completed, 2014)