**Eng Keong LUA (Dr)**

**Google Scholar:** [**https://scholar.google.com.sg/citations?user=qEO5-CkAAAAJ&hl=en**](https://scholar.google.com.sg/citations?user=qEO5-CkAAAAJ&hl=en)

**6 Intellectual Property Patents:** [**https://patents.google.com/?inventor=Eng+Keong+Lua**](https://patents.google.com/?inventor=Eng+Keong+Lua)

# Education

|  |  |
| --- | --- |
| **University of Cambridge, England, UNITED KINGDOM** | 2002 – 2005 |
| **Ph.D. in Computer Science** |  |

Cambridge-College Senior Scholar Prizes 2003 – 2005

**Microsoft Research Fellowship [Microsoft Research, USA & UK]**

## EPSRC e-Science Scholarship Cambridge-MIT Research Grant Support

Supervisors: Professor Jon Crowcroft and Professor Timothy Griffin

Thesis: The Structure of Internet Latency

**University College London (UCL), England, UNITED KINGDOM** 1996 – 1997

**M.Sc. in Telecommunications, Distinction (Top in the M.Sc. class)**

## Singapore Government Postgraduate Overseas Scholarship

Thesis Supervisor: Professor Sir John J. O’Reilly (Chairman of A\*Star SERC)

Thesis: ATM Interworking, Interoperability and Internetworking across Private and Public Network Domains

**National Institute of Education (NIE), NTU, SINGAPORE** 1995 – 1996

**Postgraduate Diploma of Teaching in Higher Education (PGDipTHE)**

## Singapore Government Postgraduate Local Scholarship

Thesis: An Analytical study on the use of Cooperative Learning (CL) strategies in technical and non-technical subjects in higher education

**National University of Singapore (NUS), SINGAPORE** 1990 – 1993

**Nanyang Technological University (NTU), SINGAPORE**

**B.A.Sc. in Computer Engineering, Merit**

## Singapore Government Undergraduate Local Scholarship

Thesis: Hand-written Character Recognition – Improved Supervised Neural

Network Learning (Thesis: **Artificial Intelligence (AI)** – 1993 IEEE paper)

**Raffles Junior College, SINGAPORE** 1985 – 1987

**GCE 'A' LEVEL**

Distinctions in ‘A’ level Mathematics C and Further Mathematics C, Physics,

Computer Science and Mathematics C Scholarship Paper (S-Paper)

# Professional Experience

2018 – 2020 **Group Director (Head of Division – HoD)**

**Intelligent Computing & Infrastructure Solutions Division**

**Infocomm Media Development Authority (IMDA), Singapore**

Leading new industry future-ready Info-Communication Technology (ICT) solutions with Cloud-natives on newly created Human and Machine

Collaboration Systems (HMC) R&D initiatives (NRF – SGD 30M) for

Future of Services in Government’s industry sector digitalization (SG:D):

1. Retail/Hospitality/Tourism – F&B/Hotels/Attractions, etc.
2. Modern/Professional/Financial – Digital Bank/Legal/Accountancy/Audit, etc.
3. Built Environment – Smart Estate Management Systems/Punggol 21, etc.
4. Trade & Connectivity – Transportation/Trading/Logistics/SCM/ERP, etc.

Driving SG:D framework of action through technology solutions R&D programs as a nation-wide movement to unify Singapore’s digitalization efforts. Whether helping different industries to jumpstart their digitalization journeys, or creating new ecosystems, opportunities and capabilities for the future, SG:D is to take Singapore ahead as leading global node in Asia for digital economy. [https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Digital-Economy-](https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Digital-Economy-Framework-for-Action)

[Framework-for-Action](https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Digital-Economy-Framework-for-Action)

Led and created the Services and Digital Economy Technology Roadmap (SDE TRM) specific on Technology Workgroup 5: Future-ready Technologies, which was launched on 22 November 2018 and is Research & Innovation (R&I) part of Singapore’s Digital Economy Framework for Action. It provides a scan of the digital technology landscape in the next 3 to 5 years, identifying the impact of key shifts and technology trends, equipping workers with new skills and capturing opportunities in the digital. Future Services was identified as key engine of growth with digital economy accounts for 72% of GDP.

[https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Services-and](https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Services-and-Digital-Economy-Technology-Roadmap)[Digital-Economy-Technology-Roadmap](https://www2.imda.gov.sg/infocomm-media-landscape/SGDigital/Services-and-Digital-Economy-Technology-Roadmap)

[https://www.ipos.gov.sg/docs/default-source/default-document-library/tech-scan-on](https://www.ipos.gov.sg/docs/default-source/default-document-library/tech-scan-on-human-machine-collaboration.pdf)[human-machine-collaboration.pdf](https://www.ipos.gov.sg/docs/default-source/default-document-library/tech-scan-on-human-machine-collaboration.pdf)

Also manage Smart System Research Program Office (SSRPO in NRF – SGD 450M inclusive of AISG) and spearheading both Telco 5G Cyber Security/IoT R&D initiatives and Digital First Organization (DFO) software projects (DevOps – Microservices) supported by Public Service Transformation Software Development Projects (SGD 5M): Automatic Transcription System (Speech-to-Text & Natural Language Summarization) and Data-driven Insights (Data Analytics & Visualization) with Privacy-preserving Cyber Security for Data Analytics. Leading NRF Green Data Center R&D Funding Initiative Program (NRF - SGD 60M) for efficient cooling powered Cloud computing and cooling energy efficiency innovation for tropical data center, high rise green data center, etc. Board Member of Coolest.SG initiatives under the Prime Minister Office (PMO) Strategic Programs. Notable R&D project on leveraging LNG cold energy to develop novel, energy-efficient and cost-effective cooling technology for data centers:

[https://www.businesstimes.com.sg/companies-markets/nus-keppel-and-slng-tie-up](https://www.businesstimes.com.sg/companies-markets/nus-keppel-and-slng-tie-up-to-develop-better-cooling-technology-for-data-centres?xtor=CS3-25) [to-develop-better-cooling-technology-for-data-centres?xtor=CS3-25](https://www.businesstimes.com.sg/companies-markets/nus-keppel-and-slng-tie-up-to-develop-better-cooling-technology-for-data-centres?xtor=CS3-25)

**Total 4 Divisional teams with around 50+ staffing strength.**

**2017 – 2018 Chief Technology Officer (CTO) – Hutchison Global Communications**

**I Squared Capital Inc. [US-based Private Equity Firm]**

**USA (NYC)/UK (London)/China (HK & Shanghai)/India/Singapore**

[http://www.businesswire.com/news/home/20170730005045/en/Squared-Capital](http://www.businesswire.com/news/home/20170730005045/en/Squared-Capital-Acquire-Hutchison-Global-Communications-Leading) [Acquire-Hutchison-Global-Communications-Leading](http://www.businesswire.com/news/home/20170730005045/en/Squared-Capital-Acquire-Hutchison-Global-Communications-Leading)

Chief Technology Officer’s advisory to acquisition and asset management in private equity business growth strategy to develop portfolio company’s (Hong Kong’s Hutchison Global Communications – former Li Ka Shing’s Telecomm business of USD 2B) strategic business transformation growth and future-ready technology capabilities for global Cloud Technology & Analytics solutions and managed Cyber Security services on Cyber Security Managed Service as intelligent integrated Network & Cyber Security Operation Centers (iNSoC), and Cloud-based Software Application (Machine Learning/AI – Deep Learning platform), emerging 5G Mobile network infrastructure, 5G Cyber security & software applications, etc. for new Smart Cities launched in HK. Leading as top management on business initiatives to grow future digital telecommunication services & solution applications involving 5 milestones: (1) Market Development and Analysis; (2) Product Service Descriptions; (3) Technology Innovation & Application Enablers; (4) Business Strategy Case; (5) Implementation plan with Build vs Buy and Collab. Led/managed around 1000+ Engineering and Technology teams’ strength.

2014 – 2017 **Vice President [Chief Engineering & Innovation Officer]**

**Group Enterprise – Cyber Security and Managed Services**

**Singtel, SINGAPORE / Optus, AUSTRALIA / Trustwave, USA**

Senior Enterprise Managed Service management and software engineering innovation leadership in 3 strategic areas (co-funded by EDB/NRF – SGD 500M): (1) new global Cyber Security; (2) Data Analytics; (3) Smart Cities, leveraging Telecommunication infrastructure

(Mobile and Fixed networks) and technology innovation – Multi-Cloud

Software Platform, SD-WAN & IP-VPN global services, Cyber Security SoC, Deep Learning (AI) Analytics & Smart Cities (Internet of Things – IoT), with effectiveness in Telecommunication Product Development/Collaboration IT/NoC/SoC CAPEX/OPEX (Mobile and Fixed networks) and contribute to global revenue annual targets of at least SGD 1B with around 300+ talent manpower globally. Builtup of new Divisions with talent hiring, budget planning, etc. as well as setting up new managed Cyber Security service provisioning and businesses for Go-To-Market (GTM): (1) MANAGED CYBER SECURITY SERVICE ENGINEERING & CLOUD PLATFORM managing Level 3 SOC operation and engineering; (2) TELCO CYBER SECURITY INNOVATION spearheading strategic technology incubation and R&D on strategic value creation; (3) CYBER SECURITY SERVICES & SOFTWARE SOLUTION CONSULTING in setup of Cyber Security Institute (CSI) – Cyber Range Services to conduct security resilience, penetration testing, risk assessments for Business Continuity Management (BCM) & Disaster Recovery/Resiliency.

● Accomplishments – Former Minister, Dr Yaacob Ibrahim:

Minister’s FB: <https://www.facebook.com/yaacobibrahim/posts/1158884490812724>

Minister’s Twitter: <https://twitter.com/YaacobIbrahim/status/724866695924424704>

MCI’s FB: <https://www.facebook.com/SingaporeMCI/posts/988942947808041>

MCI’s Twitter: <https://twitter.com/SingaporeMCI/status/724868024159850498>

**2013 – 2014 Executive Director – Founding [Senior Vice President]**

**NEC Laboratories Singapore, SINGAPORE**

**Vice President (Overseas Innovation)**

**NEC Laboratories, NEC Corporation, JAPAN**

**(Sister Company of NTT Corporation, Japan)**

Top engineering leadership and management in overseas technology innovation:

* Global Software Development Program leadership for new & existing NEC’s technologies created in Cyber Security and Enterprise System

Software Engineering solutions: Large Artificial Intelligence (AI) Systems & Machine Learning (ML) Analytics Solutions, Cyber Security Products, Smart Cities Technology, Enterprise SAP Systems, Web Application (.NET MVC), ECommerce Technology Framework and Mobile Application Technology Stack in IOS and Android Development, and Multi-Cloud Platform Applications with microservices orchestration-based platform enabling Continuous Integration, Delivery & Continuous Deployment in AWS, Azure and Google Cloud Platform – to provide advanced solutions, which I take lead in managing and maximizing returns on invested resources based on sound business models from the global NEC professional practices worldwide – exploiting technologies and implementing innovative solutions’ sales globally with target annual revenues of USD 2B+. Lead and manage diverse association of global effective teams of around 300+ Technology Managers & Engineers, Data Scientists, and Solution Consultants, to support NEC’s sales and market growth objectives targeting at Enterprise and Government Customers and Smart Cities Solution Engineering CAPEX/OPEX budget to achieve operational effectiveness.

* Leading and building robust enterprise architectures and DevOps/DevSecOps platforms in software engineering and working closely with enterprise customers and collaborating with stakeholders (including NTT) like commercial operations in Japan/USA, deep technology R&D labs (Tokyo/Princeton/Germany/Beijing) and software development teams in India/Vietnam. Familiar with high concurrency cloud-based and large data networked system architecture technology (Hadoop/Spark, etc.) with design of advanced AI/ML data analytics platform using cutting edge technologies which include statistical predictive modeling, regressions modeling, cross section time series modeling, longitudinal data science, Bayesian modeling, evidence based modeling, Clustering algorithms, Support Vector Machine, Optimization in Supervised/Unsupervised Neural Networks modeling, etc. as well as available toolkits/libraries similar to: ReactJS, Angular, Ansible, Sass/Less, HTML5, RedHat OpenShift, Pivotal Cloud Foundry, Python/React/Java/C++/PHP/NodeJS/Scala/Golang, etc. with remote Databases via RESTful APIs and JSONREST APIs, SQL/NoSQL as well as AI/ML libraries like Keras/Tensorflow, Caffe, PyTorch, CNTK, NLTK, scikit-learn, etc.
* Industry Member of the Singapore Ministry of Communication and Information (MCI) Infocomm Media Masterplan (IMM) 2025 Working Committee and iDA’s HetNet Focus Committee allowing the opportunity to demonstrate NEC innovative social technologies and software solutions in Softwaredefined Engineering, AI/ML Analytics and Cyber Security Solutions in Smart Cities. As NEC Labs’ Global Cyber security and Deep Learning (AI) Analytics Engineering/Solution Lab Leadership, I led close collaboration relationship with INTERPOL’s Digital Crime Center Directorate Singapore on leadership and collaboration in Cyber-Crimes, Cyber-Forensics, Cyber-Fusion, Cyber-Physical Systems (CPS) Security SoC including ICS/SCADA, etc. solutions and technologies because NEC Corporation will provide technical and human resources worth some EUR 7.6M to establish a Digital Forensic Lab and Cyber-Fusion Center – INTERPOL's Digital Crime Center in Singapore:

<http://www.nec.com/en/press/201212/global_20121218_01.html>

**2006 – 2013 Senior Vice President, Strategic Technology Business**

**Nippon Telegraph and Telephone Corporation (NTT)**

**NTT Laboratories, Tokyo, JAPAN**

Executive Director (Secondment Appointment from 2009)

Carnegie Mellon University – CyLab (Cyber Lab), USA & JAPAN

Carnegie Mellon University – Software Engineering Institute, USA

(Joint CyLab by Japanese Government, NTT Corporation and CMU, USA)

Strategic Deep Telecommunication Technology program leadership in business digitalization with management oversight of international Telco service and product development teams of around 300+ Digital Telecomm Managers/Software Engineers/Technology Consultants and implementation of Telecommunication networked system infrastructure and Cyber Security technologies contributing to annual USD 2B+ business revenues globally. The service capability was related to the reliable, dependable and secured global 24/7 Telecommunication infrastructure and ICT service operation based on agreed

Network Quality of Service (QoS) and Service Level Agreements (SLAs) through Telco network traffic data analytics on AI/ML anomalies detection techniques using Statistical/Supervised/Unsupervised Neural Networks, Peer-to-Peer (Blockchain) software engineering and Cyber Security SoC managed services solution projects, etc. under Japan Government Strategic Technology Innovation initiatives:

* NTT’s Next Generation Networks and Systems (NGNS) and the Japan’s NGN 2010 initiative worth USD 1B over 5 years.
* NTT’s New Paradigm Networks and Systems (NPNS) and the Japan’s New Generation Networks and Secured Systems (NWGNSS) 2020 innovation worth USD 2B over 5 years.

Seven international patents on new technology inventions granted in Japan and USA that were commercialized in Telco-managed network resiliency analytics solutions & security operation analytics services to achieve operational effectiveness. Book Published: Peer-to-Peer Networking and Applications, Morgan Kaufmann, Elsevier Inc., December 2008:

<http://www.p2pna.com/>

<http://www.elsevier.com/wps/find/bookdescription.cws_home/716636/description>

2003 – 2006 **Founding Development Team (Xen Virtualization)**

**Xensource Plc**

Microsoft Research Fellow [PhD Research]

Microsoft Research Cambridge, UK

* Founding development team of software operating system virtualization (Xen) startup, Xensource Plc (in 2005) Para-virtualization technologies at Network System Research group in Cambridge University Computer Lab, acquired by Citrix Systems in 2007 for 500M GBP.
* Worked on research in Peer-to-Peer (Blockchain technology) networked software & secured distributed software application, software protocol design for reliability & resiliency, Software-defined Meta-Routing, and Cloud Software Virtualization based on Xen, etc. Technology R&D work supported by Microsoft Research, UK EPSRC, Cambridge-MIT Research Institute, etc.

2000 – 2003 **Deputy Director**

**Info-communications Infrastructure Development Division**

5B**Infocomm Development Authority (iDA), SINGAPORE**

The noteworthy contributions are listed as follows:

* Work closely on National Telecommunication Infrastructure Development with Chairman and CEOs of iDA – Mr Lam Chuan Leong and Ms Yong Ying-I/Ms Tan Ching Yee as well as other Government stakeholders.
* Management and leadership of National Infrastructure Connectivity and Regulation - aimed to develop and position Singapore as the regional hub for cutting-edge Infocomm infrastructure connectivity.
* Infrastructure development leadership and Programme management of the Government-funded multi-million (SGD 400M) next generation national broadband network infrastructure development and application (S-ONE).
* Heavy involvement in the policy de-regulation and liberalization of Singapore’s telecommunication industry (WTO’s requirement) – implementation of liberalized telecommunication policies and regulations as well as industry and infrastructure competitiveness development programs.

1998 – 2000 **Consulting Manager (Certified PMP)**

**Ericsson Hewlett-Packard Telecommunications (EHPT)**

**Hewlett-Packard Consulting, SINGAPORE**

**Hewlett-Packard Company, USA**

Consulting and delivery software management system with

Telecommunication Network Management (TMN) Broker Service and Software Engineering Architecture consulting and solution implementation responsibilities for Software Solution Development Teams in multiple overseas sites – USA, Middle East (Egypt and Israel), India and Singapore sites. Managed and led the Project Team Managers and total staff strength of around 200+ Software Development Engineers/System Consultants to design, implement, deploy and deliver the networked software operation and security management systems based on HP Openview/Service Assurance technology, worth USD 52M and USD 70M.

1993 – 1998 **Technical Director**

**Internet Software Technology Center**

**Cisco Systems Networking Regional Academy, SINGAPORE**

**Senior Faculty / Head**

**Temasek Polytechnic, SINGAPORE**

**Ministry of Education, SINGAPORE**

Key leadership and contribution as PSC MOE Scholar:

* Ministry of Education (MOE) Public Service Commission (PSC) Scholar bonded for 6 years working on Higher Education, to setup the 3rd and 4th Polytechnics – Temasek and Nanyang, developed and delivered software engineering teaching courses. Certified as Cisco System Certified Academic Instructor for Cisco System Certified Networking Professional certification.
* Led a team of 3 faculty members as the founding team of the new Internet Software Technology Center and the Cisco Systems Networking Regional Academy (CNRA), co-funded SGD 1M annually by Singapore Economic Development Board (EDB) and Cisco Systems, USA.