Anthony Li

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EDUCATION

M.D. Doctor of Medicine, Duke NUS Medical School — Aug 2015 – Jun 2019

- Thesis: Application of Machine Learning to Acute Coronary Syndrome patients to predict reinfarction and mortality

B.Eng. Electrical Engineering, National University of Singapore — Aug 2009 – Jun 2013

- Awarded First Class Honors (GPA: 4.5/5)
- Thesis: Automated Prostate MRI Segmentation [Thesis link]
- Relevant Courses: Advanced Control Systems, Computer Vision, Analytical Methods in ECE

MEDICAL EXPERIENCE

Preventive Medicine Resident, National University Health System — Jul 2022 – Present

- Led Ministry of Health's public consultations with 17 stakeholder groups (total of 680 individuals including medical and legal professionals), drafted legislation and performed policy reviews for the Health Information Bill, in support of Singapore's population medicine program, Healthier SG.
- Supported the Bioethics Committee Office in the drafting of ethical guidelines for Big Data, Artificial Intelligence and Human Nuclear Genome Editing in biomedical research.

Medical Officer, Tan Tock Seng Hospital, Clinical Epidemiology — Jan 2021 – Jun 2022

- Operated the following key daily surveillance systems: (1) Staff Acute Respiratory Infections. (2) Inpatient mortality. (3) Inpatient severe Dengue infections. (4) Inpatient and outpatient COVID-19 cases. (5) Emerging Infectious Disease horizon scanning.
- Supported the department's hospital COVID-19 Contact Tracing (CT) and Public Health (PH) operations over the Delta and Omicron waves.
- Performed weekly generation of Singapore's national COVID-19 real time reproduction number using LSHTM's EpiNow2 model (non-stationary Gaussian process model).
- Performed research specialising in application of Artificial Intelligence and Machine Learning techniques to mortality and morbidity risk prediction for sepsis (n=39,029), COPD (n=2160) and vasculitis (n=447) patient populations.

Medical Officer, Sengkang General Hospital (SKGH), General Medicine — Oct 2020 – Dec 2021

- SKGH isolation and high risk acute respiratory infection wards: Medical management of acute severe pnuemonia and COVID-19 patients.

Medical Officer, Tan Tock Seng Hospital (TTSH), Infectious Disease Service — Jul 2020 – Sep 2020

- National Centre of Infectious Diseases (NCID) and Communicable Diseases Control (CDC) outbreak wards during the COVID-19 pandemic: Medical management of COVID-19 patients.
- NCID Infectious Disease clinics: Medical management of HIV, Dengue, long COVID-19 and needle stick injury patients.
- TTSH general ward: Assisted in medical consults for Infectious Disease Service referrals.

House Officer, TTSH and SKGH — Jul 2019 – Jun 2020

- General Surgery at SKGH: Performed Machine Learning research on application of UK NHS' National Early Warning System to 30,125 patients to guide hospital policy on CTSP.
- General Medicine at SKGH and TTSH: Developed automated temperature reminder compliance software for 60 medical staff of the General Medicine Department.

OTHER PROFESSIONAL EXPERIENCE

Software Engineer, Experimental Systems and Technology Lab — Oct 2014 – Aug 2015

- Full stack development and deployment of applications for education under the Agile programming methodology. Technologies developed currently serves approximately 10,000 users.

Senior Officer, A*STAR, Science and Engineering Research Council — Aug 2013 – Sep 2014

- Technology planning, grant administration and research management for Urban Systems Initiatives (S$50 million grant), Satellite Initiatives and Infocomm Public Service Funding Research Projects.

RESEARCH PUBLICATIONS

Publications

1. Anthony Li, M. L. Ong, C. W. Oei, W. X. Lian, H. P. Phua, H. L. Htun, W. Y. Lim, M. Motani Unified Auto Clinical Scoring (Uni-ACS) with Interpretable ML models, *Proceedings of Machine Learning Research, Machine Learning for Healthcare Conference 2022* [Paper link]

2. R. Khanna, H. L. Htun, Anthony Li, H. L. Goh, W. M. Khyaw, H. Ang, B. Ang, A. Chow Staff and patient surveillance in hospitals: Good sentinels for the emergence of the SARS-CoV-2 variants, *Journal of Infection* [Paper link]

3. R. H. F. Lim, H. L. Htun, Anthony Li, H. L. Goh, W. M. Khyaw, A. H. Aung, B. Ang, A. Chow Fending off Delta – Hospital measures to reduce nosocomial transmission of COVID-19, *International Journal of Infectious Diseases* [Paper link]

4. A. Chow, H. L. Goh, W. M. Kyaw, Anthony Li, R. H. F. Lim, B. Ang, Rostered routine testing for severe acute respiratory coronavirus virus 2 (SARS-CoV-2) infection among healthcare personnel—Is there a role in a tertiary-care hospital with enhanced infection prevention and control measures and robust sickness-surveillance systems?, *SHEA Journal: Infection Control & Hospital Epidemiology* [Paper link]

5. D. W. Lim, H. L. Htun, Y. Wang, Anthony Li, W. M. Kyaw, L. T. Lee, A. Chow, Healthcare workers as 'canaries' for acute respiratory infections and pathogens during the COVID-19 pandemic, *The Journal of Hospital Infection* [Paper link]

6. Sia S. X. Y., Anthony Li, Hierarchical Module Classification in Mixed Initiative Conversational Agent System, *27th ACM Conference on Information and Knowledge Management* [Paper link]

7. Xiong W., Anthony Li, Ong S.H., Sun Y. Automatic 3D Prostate MRI Segmentation Using Graph Cuts and Level Sets, *Pacific-Rim Conference on Multimedia (PCM) 2013* [Paper link]

Abstracts

1. Anthony Li, Z. L. Huang, C. W. Oei, W. X. Lian, H. P. Phua, W. X. Ng, S. Y. Tay, Learning from failure: Explaining clinical ML model prediction errors, *Machine Learning for Healthcare Conference 2022* [Oral Presentation / Poster] [Paper link]

2. Anthony Li, C. W. Oei, H. P. Phua, W. X. Lian, L. H. Htet, S. H. Phua, G. P. Tan, H. Y. Xu, W. Y. Lim, J. Abisheganadan, Application of Uni-ACS to COPD for prediction of Frequent Readmissions, *Singapore Health and Biomedical Conference 2022* [Oral Presentation / Poster]

3. Anthony Li, C. W. Oei, H. P. Phua, W. X. Lian, L. H. Htet, W. Y. Lim, Application of Machine Learning to predict 1 year All Cause Mortality in Chronic Obstructive Pulmonary Disease, *Singapore Health and Biomedical Conference 2021* [Oral Presentation / Poster]

4. Anthony Li, T. M. Ng, A. Chow, Early identification of bacteremia and its predictors with high performing Artificial Intelligence models, *Singapore Health and Biomedical Conference 2021* [Abstract]

5. Anthony Li, AO. Sahlen, Improving clinical interpretation of extreme gradient boosted ensemble tree models of cardiac data with high proportions of missingness, *Machine Learning for Healthcare 2018* [Oral Presentation / Poster] [Paper link]

6. Anthony Li, AO. Sahlen, Superior prediction of outcome in ischemic heart disease with machine learning than regression modelling: importance of missing values, *Singapore Cardiology Society 30th Annual Scientific Meeting* [Oral Presentation]

7. Anthony Li, Deshpande A., Sarraf-Yazdi S. Making meaning out of disorienting dilemmas, assumptions and emotions: a prelude to reflective write-ups, *International Consortium of Longitudinal Integrated Clerkship 2017* [Oral Presentation]

8. Koong H. N., Bang D., Fung F. Y., Anthony Li A replay of our tutorials: A connection back to the soul of medical education, *International Consortium of Longitudinal Integrated Clerkship 2017* [Conference Workshop]

RESEARCH GRANTS

AM ETHOS Medical Student Fellowship Grant 2017, Oct 2017
Singhealth Duke-NUS Academic Medicine Center

- Awarded a $10,000 grant to study application of machine learning algortihms to Acute Coronary Syndrome patient PCI and echocardiograph datasets to predict patient mortality and morbidity.

AWARDS

Young Investigator Award in Clinical Research, Silver, *SHBC 2022* Oct 2022

- 2nd out of 365 submissions. Awarded to top clinical reserachers under 40 years old, at Singapore's National Healthcare Group's annual healthcare and biomedical congress. Cash prize of $600.

Young Investigator Award in Clinical Research, Merit, *SHBC 2021* Oct 2021

- Top 5 out of 633 submissions. Awarded to top clinical reserachers under 40 years old, at Singapore's National Healthcare Group's annual healthcare and biomedical congress.

LEAP award, *Singhealth Duke-NUS Academic Medicine Center* Jul 2019

- Awarded to 3 out of 65 selected medical students who have gotten honours grade for their clinical research projects under the mentorship of a Singhealth Academic Clinical Program Mentor. Cash prize of $3000.

2nd place, NUS-NUHS-MIT Healthcare Datathon 2018, *NUHS, NUS and MIT* Jul 2018

- 2nd out of 40 paticipating teams. Organised by NUHS to address current problems in healthcare with data analytics technologies. Leveraged on gradient boosted trees and neural networks to study risk of cardiovascular complications in 10,389 diabetic surgical patients.

1st place, Singhealth Hackathon 2017, *Singapore General Hospital* Jan 2017

- 1st out of 20 participating teams. Organised by Singapore General Hospital to gather professionals and medical students across various disciplines within Singhealth cluster for the purpose of developing new innovative ideas to improve current patient care systems. Developed CHIT, a mobile application for communication and task coordination.

A*STAR Borderless Award, *Science and Engineering Research Council* May 2014

- As a research grant administrator, I was recognised for outstanding cross agency policy contribution to A*STAR's urban system's initiative and Data Analytics platform.

Dean's List, *National University of Singapore* Jul 2013

- Awarded to top 5% of engineering students in academic excellence in NUS Faculty of Engineering.

HUMANITARIAN PROJECTS

Enabling Red Cross Youth leaders for future public and global health challenges, Red Cross South East Asian Youth Network Jul 2022 – Present

- Awarded 2500 Swiss Francs from the International Federation of Red Cross to start a public and global health humanitarian leadership training programme.
- Programme objective: To equip 20-30 Red Cross youth leaders from the South East Asian region with essential skills to design, implement and evaluate disaster preparedness and response programmes, for public health emergencies.

Project Dawn, Red Cross Youth NUS Chapter Jun 2011 – Present

- Project Dawn is an overseas community involvement programme led by the Red Cross Youth NUS Chapter. In collaboration with local non-governmental organisations and Red Cross in Cambodia, Project Dawn delivers water sanitation and health hygiene programmes in the rural areas of Cambodia.
- Led a team from 2011 to 2013 for direct missions to the province of Prey Veng. In addition to support of aforementioned programmes, team also dug wells and built libraries for 120 orphans from the Cambodia genocide by the Khmer Rogue.
- Provided advice and participated in fundraising for future teams from 2013 to 2019 for additional missions to Cambodia. Unfortunately, missions stopped due to COVID-19 pandemic. In discussion with stakeholders to restart missions.

LEADERSHIP & VOLUNTEERISM

Advisor, Red Cross Youth Leadership Advisory Panel — Jan 2021 – Present
Teacher Advisor, Red Cross Youth NUS Chapter — Jun 2014 – Present
Standard and Psychological First Aid Volunteer, Singapore Red Cross Society — Jan 2010 – Present
President, Duke NUS Medical Technologies Student Group — Aug 2017 – Aug 2018
Vice President, Duke NUS Emergency Medicine Student Group — Aug 2017 – Aug 2018
College Representative, Duke NUS Benjamin Sheares College — Aug 2017 – Jul 2019
Clinical Peer Tutor, Longitudinal Integrated Clerkship — Oct 2017 – Aug 2018
Vice President, Red Cross Youth NUS Chapter — Jun 2012 – Jun 2013
Head, Red Cross Youth NUS Chapter Disaster Management Group — Jun 2011 – Jun 2012
Logistics Head, Red Cross Youth NUS Chapter Project Rice and Project Dawn — Jun 2010 – Jun 2011

CERTIFICATIONS

Singapore Field Epidemiology Training Programme (5 weeks) NUS SSHSPH — Aug 2022
- The Singapore Field Epidemiology Training Programme (S-FETP) is conducted by the Saw Swee Hock School of Public Health and the National Centre for Infectious Diseases, to train participants in field investigation practice for infectious disease epidemiology.

Epidemiology in Public Health Practice Specialisation (20 weeks) Coursera/JHU — Oct 2021
- [Certificate link]

Deep Learning Specialisation (16 weeks) Coursera/DeepLearning.AI — Jun 2018
- [Certificate link]

Probabilistic Graphical Models Specialisation (15 weeks) Coursera/Stanford University — Dec 2018
- [Certificate link]

PROGRAMMING

Languages: Python, R, C, C++, Ruby, Octave/Matlab, HTML5, Javascript, CSS, SQL
Deep Learning Frameworks: PyTorch, Tensorflow, Keras
Packages: SKLearn, XGBoost, SHAP, MICE, Caret, Tidyr, EpiNow2
Tools: Git, Latex, RStudio, Docker, Google Analytics, Jupyter Notebook, Visual Code, Atom
Frameworks: Rails, Elasticsearch, Logstash, Kibana, JQuery, React, Flux