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

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

- 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 since the discovery of TTSH COVID-19 cluster on 28/4/21: (1) Co-develop CT and PH SOP related to TTSH staff or patient having an equivocal or detected COVID-19 result from routine surveillance. (2) Initiate and coordinate CT and PH response. (3) Liaise with MOH on final CT list and subsequent PH action.
- Wrote code to perform weekly generation of Singapore's national COVID-19 real time reproduction number using LSHTM's EpiNow2 model (non-stationary Gaussian process model). This number is currently used as part of TTSH's ICU resource usage forecast report.
- 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. Pending publications can be found in research section of CV.
- Performed research on validation of Real Time Location System (RTLS) tags, compared to golden standard of direct observation, for purposes of hospital contact tracing.
- Supported the development of surveillance report templates in NHG's transition to EPIC electronic healthcare record.

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

- SKGH isolation and high risk acute respiratory infection wards: Took care of suspect and confirmed COVID-19 patients.

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

- NCID and CDC outbreak wards during the COVID-19 pandemic outbreak: Took care of suspect and confirmed COVID-19 patients.
- NCID Infectious Disease clinics: Took care of HIV, Dengue, recovered COVID-19 and needle stick injury patients.
- TTSH main block: Assisted in replies to Infectious Disease blue letter referrals.

House Officer, Tan Tock Seng Hospital and Sengkang General Hosptial — Jul 2019 – Jun 2020

- General Surgery at SKGH: Performed 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.

Research Medical Student, National Heart Center Singapore — Sep 2017 – Jul 2019

- Performed research on predictive risk modelling for 3,885 Acute Coronary Syndrome (ACS) patients leveraging on ML methods such as XGBoost, MLP NN and LSTM RNN.
- Developed a novel method to improve ML model interpretability in ACS patients, thus identifying critical biomarkers (e.g. Creatinine, Total Cholesterol) for clinical intervention.

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. 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]
2. 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]
3. 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]
4. 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, 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* [Abstract] [Pending Review]
2. 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] [Pending Review]
3. 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]
4. 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]
5. 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]
6. 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

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

- Awarded to 5 out of 65 selected medical students who have gotten honours grade for their research projects under the mentorship of a Singhealth Academic Clinical Program Mentor. Cash price 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.

LEADERSHIP & VOLUNTEERISM

Advisor, Red Cross Youth Leadership Advisory Committee 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

PROJECTS

Coagulopathy and Acute Kidney Injury in patients with severe COVID-19 disease

- Collaborators: A/Prof Ngiam Kee Yuan and Dr Bryce Tan from NUHS as part of 4CE consortium.
- Objective: To study the inpatient trend of coagulopathy and AKI in COVID-19 patients from 96 hospitals across 5 countries.
- Reference: International electronic health record-derived COVID-19 clinical course profiles: the 4CE consortium [Paper Link]

CERTIFICATIONS

Epidemiology in Public Health Practice Specialisation Coursera/John Hopkins University Oct 2021

- Completing in October 2021

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, MICE, Caret, Tidyr
Tools: Git, Latex, RStudio, Docker, Google Analytics, Jupyter Notebook, Visual Code, Atom
Frameworks: Rails, Elasticsearch, Logstash, Kibana, JQuery, React, Flux