Franklin Leong

Aspiring neuroscientist | Making virtual reality the reality

Young, budding neuroscientist striving to change the world bit by bit through commitment and perseverance in research. Hopes to understand the brain enough such that we can creatively apply the knowledge to enhance the lives of others.

I believe that the experiences garnered through multiple research internship has prepared me well as I progress towards a PhD degree. The different laboratories allowed me to view neuroscience research through different lenses and perspectives. As technology improves and more data starts emerging in neuroscience research, I believe that machine learning and artificial Intelligence will allow us to better elucidate the mysteries of the human brain.

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EDUCATION

École polytechnique fédérale de Lausanne — Lausanne, Switzerland
Ph.D in Neuroscience (EDNE) — September 2021 to August 2025

- Co-supervision by Prof. Diego Ghezzi and Prof. Christophe Moser
- Engaging in Retinal Modelling, explanted retinal experiments

National University of Singapore — Singapore, Singapore
Bachelor of Science (Biomedical Science Specialization) — August 2017 to May 2021

- Major in Life Sciences
- Minor in Artificial Intelligence
- Interned at N.1 Institute for Health for final thesis
- Dean's List receiver
- Current cumulative GPA: 4.66/5.00 (Highest distinction/First Class Honours)

École Polytechnique Fédérale de Lausanne — Lausanne, Switzerland
Semester Exchange Program — January 2020 to August 2020

- Enrolled in Life Science Engineering major
- Took part in research internship with Prof. Gregoire Courtine, Dr. Eduardo Martin Moraud

Singapore Polytechnic — Singapore, Singapore
Diploma in Biomedical Science (Biomedical Research Specialization) — April 2012 to May 2015

- Interned at A*STAR GIS for Final Year Project
- Graduated Gold with Honours for Co-Curricular Activities
- Cumulative GPA: 3.72/4.00

RESEARCH EXPERIENCE AND INTERNSHIP

Final thesis at N.1 Institute for Health, NUS June 2020 to April 2021
Advisors: Yen Shih Cheng, Andrew Tan Yong Yi

Emergence of bump attractor properties in recurrent neural networks

- Devise, code and analyse recurrent neural network model of a working memory task with distractors
- ISOMAP to analyse simulated neural data
- Required to write a thesis of estimated 15,000 words or length of 100 pages

Research Internship at EPFL/CHUV, Lausanne January 2020 to October 2020
Advisor: Eduardo Martin Moraud in collaboration with Grégoire Courtine and Jocelyne Bloch

Comprehensive machine leaning approach to analyse Parkinsonian gait kinematics
(Manuscript in preparation)

- Designed machine learning framework to classify and predict UPDRS score
- Identified subspaces which will be useful for clinician to better evaluate gait kinematics of Parkinsonian patients
- Hope to create a software for automated generation of gait kinematics report

Research Internship at A*STAR May 2019 to August 2019
Advisor: Rosa So

Spike identification with Hidden Markov Model

- In fulfilment of requirement for A*STAR undergraduate scholarship
- Involved in data analysis and spike sorting
- Implemented Hidden Markov Model for spike sorting
- Provided a window to clinical related research

Research Internship at LKCSOM, NTU December 2018 to April 2019
Advisor: Hiroshi Makino

- Involved in the formulation of new research question and initial building of experimental rig for conducting the experiment.
- Proposed, designed, and built an experimental set-up from scratch independently
- Programmed in Arduino for the experimental rig

Research Internship at N.1 Institute for Health, NUS May 2018 to December 2018
Advisor: Yen Shih Cheng

Neuronal Code Morphing Observed during a Working Memory Task

- Experienced data collection of monkey's electro-physiological data with multi-array electrode
- Conducted data analysis of monkey's electro-physiological data with LDA and PCA.
- At the end of the research, a research report and a poster were produced
- Congress presentation for the research was held in November

Literature Review for Special Programme in Science: SP2171 Discovering Science: January 2018 to May 2018

Investigating the mechanism of attentional modulation of chronic pain

- Literature review on how attention can modulate the level of pain perceived within the brain.
- Pathway associated with nociception was examined
- Short proposal written on how the pathway could be targeted to treat chronic pain

Diploma's Final Year Project April 2014 to December 2014
Advisors: Feng Min, Yu Qiang

Ring Finger and WD Repeat Domain 3 (RFWD3) is up-regulated in breast cancer and associates with breast cancer cell survival.

- Conducted different biological experimental techniques such as: western blotting, qPCR, cell-viability assay
- Investigated on the importance of RFWD3 in the context of triple negative breast cancer survival
- At the end of the research, a research thesis was produced

TEACHING EXPERIENCE

Undergraduate teaching assistant for CS1010E: Programming Methodology August 2019 to December 2019

- In charged of a tutorial class, complementing the lectures taught
- Volunteered additional sessions for the students
- Above average grading based on survey responses by the students

SCHOLARSHIP

A*STAR Undergraduate Scholarship July 2018 - May 2021

- Awarded by the Agency for Science, Technology and Research (A*STAR), Singapore
- For individuals who display a passion for science and have achieved outstanding academic qualifications
- Required to undertake Ph.D degree after graduation

NUS-Overseas Graduate Scholarship

- Awarded by National University of Singapore
- Effort by Singapore under START scheme to nurture high calibre local talents for a career in academia
- Expected to return to NUS after Ph.D with a tenure track position.

ACADEMIC AWARDS

Dean's list for AY18/19 Semester 1

- Awarded to top 5% of the total undergraduate Science students with meritorious performance
- Required to read at least 19 credits worth of modules

GCE 'O' Level Examination 2011 Top Express Pupil with 7 Distinctions

- Awarded by the school to students who have achieved the highest number of distinctions for Cambridge 'O' Level examination.
- This award is presented to student during the graduation from secondary school

Best in Secondary 4 Express Level for Mid-Year Examination 2011

- Awarded to student who scored the highest for overall subjects among the cohort.
- Presented to student after mid-year examination

Edusave Scholarship 2010 and 2011

- Awarded to student by the Ministry of Education who scored top 10% in the school's level.

CONFERENCE AND POSTER PRESENTATION

Leong, F., Feng, m., Tan, T.L. (2015). *Ring Finger and WD Repeat Domain 3 (RFWD3) is up-regulated in breast cancer and associates with breast cancer cell survival*. In Young Scientists' Symposium 2015

LEADERSHIP POSITIONS

Committee member of interdisciplinary Special Program in Science January 2018 to December 2018

- Involve in planning multiple events for the community
- Engaging with the members of special program in science

Officer of the Singapore Armed Forces December 2016 to August 2017

- Manage, train, and lead a platoon of men
- Involved in planning and execution of classified operations
- Experiences with logistical planning for large scale operations
- Understand and empathise with the situations of subordinates
- Awarded an advanced certificate in team leadership by Singapore Workforce Skills Qualifications

Committee member of School of Chemical and Life Sciences academic society April 2013 to April 2014

- Involve in leading and planning multiple events for the faculty including large scales events involving more than 100 participants
- Experiences with handling large finances

MODULES PROJECT

Project for CS3244: Machine Learning August 2019 to November 2019

Death to Pac-Man: Ghost revolution with multi-agent deep reinforcement learning

- Reinforcement Learning was implemented in python for the project component of this module CS3244: Machine Learning).
- Integrated the code of OpenAI's Multi-Agent Deep Deterministic Policy Gradient (MADDPG) with Pac-Man game engine from UC Berkeley
- Objective was to get the ghost agent in the game of Pac-Man to cooperate with each other to capture Pac-Man
- Code can be found at https://github.com/FranklinLeong/death-to-pacman.git