Samuel **Leong** Chee Weng

ELECTRICAL AND COMPUTER ENGINEER · INTEREST IN ROBOTICS, COMPUTER VISION AND EMBEDDED SYSTEMS

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Education

Carnegie Mellon University (CMU)   *Pittsburgh, PA, USA*

MASTERS OF SCIENCE, MAJOR IN ELECTRICAL AND COMPUTER ENGINEERING (QPA 4.0)   *Class of 2023*

- 16-833: Localization and Mapping **A**
- 16-761: Mobile Robots **A**
- 16-883: Provably Safe Robotics **A**
- 18-661: Intro. to Machine Learning **A**

- 16-824: Visual Learning and Recognition **A**
- 18-848: Embedded Deep Learning (TinyML) **A**
- 18-642: Embedded Software Engineering **A**
- 18-660: Optimization **A**

*NOTE: CMU does not issue **A+** for 18-xxx courses. **A+** grades are sometimes given in 16-xxx courses.*

Carnegie Mellon University (CMU)   *Pittsburgh, PA, USA*

BACHELORS OF SCIENCE, MAJOR IN ELECTRICAL AND COMPUTER ENGINEERING, MINOR IN ROBOTICS
UNIVERSITY HONORS (QPA 3.96)   *Class of 2022*

- 16-385: Computer Vision **A**
- 18-349: Embedded Systems **A**
- 18-370: Fund. of Controls **A**
- 21-241: Matrices and Linear Transformations **A**
- 36-225: Intro. to Probability Theory **A**
- 21-259: Calculus in 3D **A**
- 21-260: Differential Equations **A**

- 16-384: Robot Kinematics and Dynamics **A**
- 16-311: Intro. to Robotics **A**
- 18-213: Intro. to Computer Systems **A**
- 18-240: Struct. and Design of Digital Systems **A**
- 18-220: Analog Circuits and Devices **A**
- 18-290: Signals and Systems **A**
- 16-467: Human-Robot Interaction **A**

*NOTE: CMU does not issue **+/−** grades for undergraduate courses.*

Skills

Programming   C/C++, Python, MATLAB, Bash, HTML5/CSS, JavaScript, NodeJS, Java, PHP/MySQL
Hardware   Breadboarding/Soldering, TI-MSP430, Arduino
Languages   English, Chinese, Cantonese, ASL

Experience

DSO National Laboratories   *Singapore*

RESEARCH INTERN: 3D RADAR ODOMETRY FOR ADVERSE WEATHER CONDITIONS ⬡ CFEAR2D   *Jun. 2022 - Aug. 2022*

- Successfully implemented 2D version of CFEAR radar odometry paper by Adolfsson et. al. in C++, using the OpenCV and Ceres Solver libraries.
- Ported 2D code to 3D, for use with a new 3D radar. Algorithm to be adapted and used for novel 3D radar odometry research.

DSO National Laboratories   *Singapore*

RESEARCH INTERN: REAL-TIME RADAR ODOMETRY FOR ADVERSE WEATHER CONDITIONS USING PHASE CORRELATION AND LOCAL POSE-GRAPH ESTIMATION   *Jun. 2020 - Aug. 2020*

- Successfully implemented phase correlation and partially implemented local pose-graph estimation components of the PhaRaO radar odometry paper by Park et. al. in C++, using the OpenCV and Ceres Solver libraries.
- Algorithm to be adapted and actively used for organisation's unmanned ground vehicles. It will be part of a radar odometry pipeline, to supplement LiDAR for navigation in adverse conditions such as rain and dust.

CMU Human And Robotic Partners (HARP) Lab   *Singapore*

RESEARCH INTERN: EVALUATING MULTI-VIEW HUMAN POSE ESTIMATION ALGORITHM ON CMU PANOPTIC STUDIO AND OTHER DATASETS ❶ ▢ LEARNABLE-TRIANGULATION-PYTORCH   *Nov. 2019 - May 2019*

- Briefly evaluated various state-of-the-art methods for multi-view 3D human pose estimation, and sought to adapt the most suitable one for use on a dataset which the lab had collected prior.
- Successfully developed an open source toolkit in Python for evaluating the CMU Panoptic Dataset using Iskakov et. al.'s learnable triangulation algorithm.
- Also worked on generalising the toolkit for use with general datasets, including that of the lab.
- Been approached by PhD students to help integrate my work into their active research.

DSO National Laboratories   *Singapore*

RESEARCH INTERN: INTEGRATED DATA ANNOTATION AND AUGMENTATION TOOL FOR OBJECT RECOGNITION AND TRACKING   *Feb. 2019 - Apr. 2019*

- Successfully developed a data annotation and augmentation tool in C#. The tool was integrated with a proprietary algorithm provided by our mentor (adapted from YOLOv2 and another proprietary tracking algorithm).
- Used the tool we developed to generate bounding box data, correct it manually, and augment it automatically. We then used the data for retraining the said algorithm.
- Also explored ways to improve the algorithm by adapting it for use with YOLOv3 and other trackers.

DSO National Laboratories   *Singapore*

RESEARCH INTERN: LOW-POWERED WIRELESS SOUND PROCESSING   *Jan. 2017 - Feb. 2017*

- Successfully implemented and tested algorithm for communication between a TI-MSP430 microcontroller and an ASIC Chip *(Application Specific Integrated Circuit)*, via the Serial Peripheral Interface *(SPI)* Protocol.
- Implemented data transmission from said microcontroller to another via Wi-Fi, to allow for wireless data processing.
- Algorithm further modified by organisation for their internal applications.

DSO National Laboratories   *Singapore*

RESEARCH INTERN: OPTICALLY-ILLUMINATED DIRECTIONAL SENSING FOR GUIDANCE SYSTEMS ❶   *Apr. 2015 - Mar. 2016*

- Successfully prototyped an analog circuit capable of demodulating and amplifying a frequency-modulated laser signal.
- Programmed algorithm on TI-MSP430 Launchpad microcontroller to digitise analog input from circuit. Digitised signal then used to sense direction of laser-point, and actuate a novel omni-directional land robot.
- Represented Singapore at Intel International Science and Engineering Fair (ISEF).

DSO National Laboratories   *Singapore*

RESEARCH (TEAM): ANALYSIS OF MULTIMODAL INTERACTION METHODS FOR MULTI-TASKING ❶   *Apr. 2014 - Jan. 2015*

- Tested intuitiveness and efficiency of multiple interaction methods (eye-tracking, gestures, touch, speech and keyboard) in completing load-intensive tasks, via a custom-designed Flash game.
- Helped team design said Flash game, and a custom website to highlight advantages of eye-tracking.
- Presented to then Minister of State for Defence, Mr Maliki Osman, at the Young Defence Scientists Congress

Honors & Awards _____

2022	**University Honors**, Bachelors of Science in ECE, University Honors, May 2022	*Pittsburgh, PA, USA*
2022	**Dean's List**, Spring 2022, 4.0 GPA	*Pittsburgh, PA, USA*
2021	**Dean's List**, Fall 2021, 3.95 GPA	*Pittsburgh, PA, USA*
2021	**Dean's List**, Spring 2021, 4.0 GPA	*Pittsburgh, PA, USA*
2020	**Dean's List**, Fall 2020, 4.0 GPA	*Pittsburgh, PA, USA*
2020	*Dean's List*, Spring 2020, 4.0 GPA	*Pittsburgh, PA, USA*
2019	**Dean's List**, Fall 2019, 4.0 GPA	*Pittsburgh, PA, USA*

INTERNATIONAL

2016	**Finalist**, Intel International Science and Engineering Fair (ISEF)	*Phoenix, AZ, USA*

NATIONAL

2017	**Awardee**, DSTA Undergraduate Scholarship (Overseas)	*Singapore*
2016	**Gold, ISEF Delegate**, Singapore Science and Engineering Fair (SSEF)	*Singapore*
2014	**Bronze**, National Informatics Olympiad (NOI)	*Singapore*
2014	**2nd (Team), Bronze (Indv.)**, Singapore Physics Engineering Challenge	*Singapore*
2014	**Bronze**, Singapore Junior Physics Olympiad (SJPO)	*Singapore*
2014	**Outstanding Student Award**, Hwa Chong Institution (High School)	*Singapore*
2013	**Bronze**, Singapore Junior Physics Olympiad (SJPO)	*Singapore*

Extracurricular Activities

InterVarsity Christian Fellowship (IVCF)   *Singapore*
CHAIRPERSON, BIBLE STUDY LEADER   *2021 - 2023*

- Chairperson of IVCF. Involved in leading the chapter, supervising executive team, and organizing events.
- Small Group Bible Study Leader. Involved in leading a study session of the Bible and mentoring students under my care both spiritually and emotionally.

Inter-Fellowship Association (IFA)   *Singapore*
PHILLY MISSIONS LEADER   *Mar 2023*

- Co-led a week-long missions trip to Kensington, Philedalphia, where we helped various long-term ministires that tended to the homeless and drug addicted population there. The team gave out food, played music, prayed with them, and talked to them about Jesus. We also hosted a Vacation Bible School session for the kids.
- Involved with coordinating trip logistics, communicating with various ministries, and overseeing and mentoring the 19-person team.

CMU Foosball Club   *Singapore*
CHAIRPERSON   *2020 - 2023*

- Chairperson of the CMU Foosball Club. Revived the club after 6 years of inactivity.

Hwa Chong Computer and Robotics Club   *Singapore*
CHAIRPERSON   *2011 - 2016*

- Chairperson of the Junior College (2016) and High School (2014) section of the club. Facilitated the merger and co-operation of the computer and robotics club.
- Gained expertise in web and game programming through self-motivated learning. Also trained for the National Informatics Olympiad, and attained bronze in 2013.
- Challenged my programming skills by participating in several team competitions:

2015   **3rd**, NYAA Canada-Singapore Website Design Competition
2015   **Consolation Award (4th)**, Singapore Games Creation Competition *(SGCC)* ⓘ
2014   **Finalist (Top 5)**, Splash Awards *(app prototyping competition)*
2014   **Commendation Award (Top 10)**, SGCC ⓘ