# 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*

Bachelors of Science, Major in Electrical and Computer Engineering, Minor in Robotics *Class of 2022*

Key Classes Taken/Taking:

- 16-833: Localization and Mapping A
- 16-761: Mobile Robots A
- 16-385: Computer Vision A
- 18-349: Embedded Systems A
- 18-370: Fund. of Controls A
- 16-384: Robot Kinematics and Dynamics A
- 16-311: Intro. to Robotics A
- 18-213: Intro. to Computer Systems A
- 18-642: Embedded Software Engineering
- 18-661: Intro. to Machine Learning
- 21-241: Matrices and Linear Transformations A
- 21-259: Calculus in 3D A
- 21-260: Differential Equations A
- 36-225: Intro. to Probability Theory A
- 18-240: Struct. and Design of Digital Systems A
- 18-220: Analog Circuits and Devices A
- 18-290: Signals and Systems A
- 16-385: Human-Robot Interaction A
- 16-824: Visual Learning and Recognition

## 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** CFEAR *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. 2019 - 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 ℹ learnable-triangulation-pytorch *Feb. 2019 - Apr. 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 ℹ *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 ℹ *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

University

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 - Present*

- Chairperson of IVCF. Involved in leading the chapter 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.

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

- 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