鄭聖文 Sheng-Wen (Colin) Cheng

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Employment

NVIDIA Feb. 2024 - Present
System Software Engineer Taipei, Taiwan

- Develop Platform Security Controller (PSC) firmware to protect Linux for Tegra and autonomous-vehicle products
- Implement security features including boot-image measurement, authentication, encryption, decryption, etc.

GallopWave Sept. 2023 - Feb. 2024
Sensor Fusion Engineer Taipei, Taiwan

- Validated lane-matching algorithms using high-definition (HD) maps for advanced driver-assistance systems (ADAS)

Avilon Intelligence Sept. 2018 - Mar. 2021
Embedded System Engineer Tainan, Taiwan

- Designed an ARM Cortex-A72–based onboard computer for UAVs, covering PCB layout and system bring-up
- Developed a 4G LTE system-on-module (SoM) baseboard for UAV remote control and video streaming
- Built vision-based tag-detection and localization software to enable autonomous drone landing

Education

National Taiwan University Sept. 2022 - May 2024
Ph.D. Student in Electrical Engineering (Withdrew) Taipei, Taiwan

- Transitioned to industry to gain professional experience while remaining involved in academic activities
- Presented at the **Embedded Open Source Summit (EOSS) 2024**, organized by the **Linux Foundation**

National Yang Ming Chiao Tung University Sept. 2019 - Nov. 2021
M.Sc. in Robotics Hsinchu, Taiwan

- **Master Thesis:** Design of Indoor-Outdoor Smooth Transferable Unmanned Aerial Vehicle
- Primary contributor to a collaborative research project with the **Taiwan Space Agency (TASA)**
- Two conference papers on quadrotor H_∞ control and error-state Kalman filter for localization after graduation

Providence University Sept. 2015 - June 2019
B.Eng. in Computer Science and Information Engineering Taichung, Taiwan

- First Prize in the graduation project with optical-flow velocity estimation and altitude control for quadrotor.
- Conducted real-time UGV research with a paper published at the Science and Information Conference (SAI), UK.

Academic Service

- Invited Reviewer for the **American Control Conference (ACC 2026)**

Certificate Coursework

MITx MicroMasters Program in Statistics and Data Science Jan. 2024 –Dec. 2025
Certificate Program by Massachusetts Institute of Technology on edX

- Coursework: Probability, Statistics, Machine Learning, Time Series with Interventions, and proctored exams

Projects

NCRL Flight Control [Video]

- Leading developer of the holistic system to build an agile quadrotor with nonliear control and state estimation

- Project licensed to the Taiwan Space Agency (TASA) for research on aggressive quadrotor maneuver control

Tenok: A Linux-like RTOS for Robotics and IoT [GitHub]

- Built a POSIX-compliant RTOS optimized for ARM Cortex-M, adopting Linux-inspired kernel designs for robotics
- Implemented Unix-style OS features including pthreads, mutexes, semaphores, pipes, message queues, and signals
- Added Linux-like kernel mechanisms such as kthreads, wait queues, SLAB, kfifo, tasklets, printk, etc.

PU-01: Twin-boom Fixed-wing UAV [Link]

- Determined aerodynamic parameters, performed airfoil selection, and conducted stability analysis using XFLR5
- Created 3D CAD models of the structural components and fabricated the complete airframe

Semu: Minimalist RISC-V System Emulator [GitHub]

- Contributed to VirtIO hardware virtualization of GPU, input devices, storage, and random number generator

Publications

[1] **S.-W. Cheng** and T.-H. Cheng, "Data-Driven Estimation of Quadrotor Motor Efficiency via Residual Minimization," under review, 2025. arXiv:2510.11388. [Link]

[2] **S.-W. Cheng** and Y.-H. Huang, "A Computationally Efficient GNSS/INS Design of Multirotor based on Error-state Kalman Filter," *2023 62nd Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE)*, Tsu, Japan, 2023. [Link]

[3] **S.-W. Cheng** and H.-A. Hung, "Robust State-Feedback H_∞ Control of Quadrotor," *2022 International Automatic Control Conference (CACS)*, Kaohsiung, Taiwan, 2022. [Link]

[4] S.-W. Wang, **S.-W. Cheng**, and C.-C. Huang, "Puyuma: Linux-based RTOS Experimental Platform for Constructing Self-Driving Miniature Vehicles," *Science and Information Conference (SAI)*, London, United Kingdom, 2018. [Link]

Presentations

[1] "Building a Quadrotor Simulator with Python - Modeling, Simulation, and Control," Open Tech Conference (OpenTechConf 2025), Hong Kong, 2025. [Link] [PDF]

[2] "Crafting a Vision-Aided Software Stack for UAV," Embedded Open Source Summit (EOSS 2024, **Linux Foundation Event**), Seattle, USA, 2024. [Link] [PDF]

[3] "Creating a Linux-like Real-Time Operating System for Quadrotor Drones," Conference for Open Source Coders, Users, and Promoters (COSCUP 2024), Taiwan, 2024. [Link] [PDF]

[4] "Tenok: Build a real-time operating system for Robotics," Conference for Open Source Coders, Users, and Promoters (COSCUP 2023), Taiwan, 2023. [Link] [PDF]

Invited Talks

[1] "Trends in Machine Learning for Unmanned Aerial Vehicle Applications," Mobile Open Platform (MOPCON 2024), **Keynote speaker**, Taiwan, 2024. [Link] [PDF]

[2] PEGATRON Corporation: "Trends and lessons learned in deep learning and generative AI applications for UAV," Taipei, Taiwan, 2024.