Witsanupong Kolakul

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Education

Chulalongkorn University — Bangkok, Thailand
B.Eng. in Computer Engineering and Digital Technology (CEDT) — *Aug. 2026 – Present*

Publications

Advanced Seasonal Color Analysis for Perceptually-Aware Image Classification — CVPR 2026
Conference Paper · Full Paper | Computer Vision, Color Science, FaRL, CIEDE2000, CIELAB, PyTorch
- Proposed two-stage **UColor** architecture (FaRL backbone + hybrid Cross-Entropy & CIEDE2000 perceptual loss in CIELAB space) to bridge the RGB perceptual gap, reducing cross-undertone errors by **4.2%**.

Perceptual Loss-Based Approaches to Personal Color Season Classification — CVPR 2026
Workshop Paper · Non-archival Track (4 pages) | Computer Vision, Color Science, Perceptual Loss
- Presented practical implementation details of **UColor** for perceptually-aware seasonal color classification, achieving a **13.4% accuracy improvement** over baseline methods.

Experience

Backend Engineer — Sep. 2026 – Present
CEDT Solution Club, Chulalongkorn University — *Bangkok, Thailand (Hybrid)*
- Architected 30+ async REST endpoints across 10 services (**CEDT Startup Co-op**) using FastAPI, SQLAlchemy 2.0, and PostgreSQL 16 with advisory locks, DB triggers, and 3-tier RBAC (Google OAuth2/JWT) for strict tenant isolation.
- Hardened data integrity across 20 Alembic migrations with optimistic locking and a 100+ test CI regression suite (Pytest, Playwright) deployed on Docker and Huawei Cloud.

Avionics Engineer — Sep. 2026 – Present
CU High Altitude Research Club (CUHAR), Chulalongkorn University — *Bangkok, Thailand (Hybrid)*
- Engineered multi-threaded C/C++ flight firmware (**CURSR-VI**) on STM32U5 (Cortex-M33 @ 160 MHz / FreeRTOS) streaming 500 Hz IMU/barometer data with a 15-state EKF; validated via 50+ >10g HIL simulations with zero anomalies.
- Fabricated custom KiCad flight computer PCBs (70+ nets, 100+ parts) with 2S-LiPo buck power (8.4V→3.3V) and 50Ω LoRa RF routing.

Onboard Computer & Flight Software Engineer — Aug. 2026 – Present
CU Satellite & Aerospace Technology Club (CUSAT), Chulalongkorn University — *Bangkok, Thailand (Hybrid)*
- Developed C/C++ flight software on EOS Orbit OBC (Cortex-M4 @ 80 MHz) for **CUSAT-1** (ISS Kibo), maintaining <80% CPU and ≤50% SRAM via static allocation/RMS, with multi-bus pipelines (SPI DMA, UART, I2C) for 33+ sensors and <1.0 s FDIR.
- Implemented CCSDS 133.0-B packetization and Reed-Solomon RS(255, 223) FEC for 1.0–2.0 Mbps S-band downlinks (<19 s/MB) and ≤500 ms telecommand ACK/NACK latency.

AI Research Assistant (Intern) — Dec. 2025 – Apr. 2026
Uphasia Artificial Intelligence Co., Ltd. — *Bangkok, Thailand*
- Researched perceptual-aware deep learning color models (PyTorch, FaRL, CIELAB/CIEDE2000), designing hybrid loss functions and authoring two CVPR 2026 papers.

Selected Projects

DeploySat Flight Computer | *KiCad 10, STM32H743, ESP32-S3, Python EDA* — June 2026 – Present
- Iterated open-source rocket/CubeSat flight computer across 3+ revisions (0-ERC, 70 nets, 101 symbols) with Python EDA scripts generating ERC-clean schematics from wiring specs.

8-bit Multi-Cycle Mini CPU with Stack | *Digital Logic, HNeemann Digital, Python, Java* — Oct. 2026
- Designed ALU and autonomous arithmetic engines for a 45-instruction (incl. CALL, RET, SSUM) 8-bit multi-cycle CPU with a 5-level RAM arbiter, passing 26/26 automated grader testcases.

AI for Thai — Exercise Form Analysis | *MediaPipe, Pathumma LLM, VAJA TTS* [GitHub] — Dec. 2025
- Built a real-time AI workout coaching pipeline combining MediaPipe pose estimation, Pathumma LLM feedback, and VAJA Thai TTS for squats, deadlifts, and bench press.

CANSAT–ROCKET 2025 Flight & Ground System | *C++, ESP32, LoRa, Python* [GitHub] — Oct. 2025
- Built end-to-end flight software, parachute deployment logic, and real-time ground telemetry; won **Best Deployment Award** among 104 national teams.

Leadership & Awards

- **Teaching & Advising:** TA, POSN Computer Olympiad Camp 1 (Sep.–Oct. 2026, C++/Algorithms); Instructor, AI Innovation & Rapid Prototyping Bootcamp (Aug. 2026); Technical Advisor, Thailand CANSAT–ROCKET 2026 (National Deployment & Best Failure Awards).
- **National Awards:** 1st Runner-Up, OIC InsureTech Award 2025 (400+ teams, 70K THB); Silver Medal, Thailand AI Engineering Championship 2025 (800+ participants); 1st Runner-Up, DeafTech Hackathon 2024; Outstanding AI Award, AI Builders 5.

Technical Skills

Languages: Python, C/C++, JavaScript/TypeScript, SQL **AI/CV**: PyTorch, TensorFlow, FaRL, CLIP, OpenCV, MediaPipe, XGBoost, CIELAB/CIEDE2000
Backend/DevOps: FastAPI, SQLAlchemy 2.0, PostgreSQL, Alembic, React, Node.js, Docker, Git, GitHub Actions, Pytest, Playwright, Huawei Cloud
Embedded/Aerospace: STM32 (Cortex-M4/M33, FreeRTOS), ESP32, KiCad, LoRa, SPI/I2C/UART, CCSDS, Reed-Solomon FEC, LaTeX