CANG DONGCHENG

+65 9899 5082 | dccang@u.nus.edu | LinkedIn | GitHub | cangdongcheng.github.io

Education

National University of Singapore Aug 2022 – May 2026 (Expected)
B.Eng. in Biomedical Engineering (Honours) Singapore

GPA: 4.2 / 5.0

- **Relevant coursework:** Biomedical Imaging & AI Applications (BN3406), Biosignal Processing & Instrumentation (BN2403), Uncertainty Analysis & Numerical Methods (CE2407), Biostatistics (BN2102), Cell Biology, Molecular Genetics, Biochemistry & Biomaterials.

Hwa Chong Institution Jan 2020 – Dec 2021
Junior College Diploma, graduated with Merit Singapore

Research Experience

Final Year Project — Digital Heart Lab, NUS Aug 2025 – May 2026
Advisor: Dr. Lei Li Physics-informed ECG surrogate model for efficient cardiac digital twin

- Designing a neural operator surrogate that preserves PDE constraints, enabling near real-time prediction of cardiac electrophysiology and 12-lead ECGs from patient-specific anatomies — addressing the speed bottleneck of FEM-based cardiac digital twins.
- Built an end-to-end mesh processing pipeline from raw cardiac anatomy to simulation-ready biventricular models: surface truncation at the basal plane, volumetric tetrahedralisation via InSilicoHeartGen, surface labelling with the Cobiveco coordinate system, and anisotropic fibre assignment via the LDRB algorithm.
- Generated high-fidelity ground-truth electrophysiology fields using ten Tusscher–Panfilov ionic models coupled with monodomain/bidomain PDEs, solved via FEM in openCARP and parallelised across HPC nodes.
- Extending the DIMON neural operator framework to biventricular meshes and to richer outputs (12-lead ECG, reaction dynamics), beyond DIMON's original scope of activation-time and repolarisation maps.

Research Intern — Temasek Life Sciences Laboratory (TLL) May – Aug 2024
PI: Dr. Shen Lisha Mentor: Dr. Fan Sheng Singapore

- Investigated the function of RRM1, an RNA-binding protein, in *Arabidopsis thaliana* development through molecular cloning, genotyping, microscopy, and transcriptomics.
- Established a genotyping pipeline (DNA extraction, PCR, gel electrophoresis) and screened plant lines for homozygous *prr7 rrm1* and *prr9 rrm1* double mutants; confirmed the *rrm1* leaf morphology phenotype (curly leaves, serrated edges).
- Constructed FLAG-tagged expression vectors via restriction-enzyme cloning and ligation, generating 40/40 confirmed transgenic lines through Agrobacterium-mediated transformation.
- Characterised trichome morphology by SEM, contributing to the discovery of MTB's role in trichome branching (*mtb* mutants exhibited 4–6 branched trichomes vs. 3-branched wild-type).

Undergraduate Research Volunteer — NUS Dec 2022 – May 2023

- Designed validation experiments for a magnetically actuated polymer device intended for medical applications, working under PhD-student supervision.
- Prepared polymer samples and characterised mechanical properties to demonstrate actuation performance.

Industry Experience

R&D Engineering Intern — KLA Singapore Jan – May 2025

- Engineering internship in semiconductor equipment R&D within a cleanroom environment.
- Developed modular software tools for hardware test automation, including Ethernet-based device communication and finite-state-machine modelling for system control.
- Worked with advanced optical microscopy techniques (DIC, dark-field) and applied AI-assisted coding workflows in iterative software development.

Teaching

Teaching Assistant, EG1311 Design and Make — NUS Aug – Dec 2023

- Tutored a project-based engineering course in which students built Arduino-controlled obstacle-traversing model cars; supported students with laser cutting, electronics troubleshooting, and embedded debugging.

Selected Projects

Biomedical Imaging with AI (BN3406) 2026

- Built end-to-end medical image analysis workflows: preprocessing (spatial normalisation, bias-field correction), segmentation (U-Net and classical methods), and deformable image registration with VoxelMorph.
- Final group project: 4D flow MRI reconstruction for the CMRx4DFlow MICCAI 2026 Challenge.

CPU Design from NAND Gates 2026

- Built a functional 32-bit RISC-V CPU from a single NAND primitive: gates → multiplexers → ALU → registers → program counter, described in HDL and verified with RISC-V assembly programs.

ECG Acquisition and Biosignal Processing 2024

- Implemented the full biosignal pipeline in MATLAB: ECG acquisition, signal conditioning, and frequency-domain analysis using Fourier transform for cardiac waveform characterisation.

Leadership & Service

Event Planning Lead, *Cultural Kaleidoscope* — UTown Residence, NUS Aug 2024 – Present
Resident Assistant, neighbourhood team

- Co-led the neighbourhood team across two editions (2024 and 2025) to plan and host a residence-wide cultural celebration for 300+ residents, bringing together local students and international exchangers.
- End-to-end event planning: concept development, logistics, venue and vendor coordination, volunteer recruitment, and day-of execution; worked with the residential life office and fellow RAs.
- Established as a recurring highlight of the UTown Residence calendar.

Volunteer Tutor, Inaudible Moments — Deaf Society of Singapore May – Dec 2020

- Tutored secondary school students in multiple subjects to raise funds for the Deaf Society of Singapore.

Technical Skills

Programming: Python, MATLAB, HDL
Computational & ML: Deep Learning, Physics-Informed Neural Networks (PINNs), Neural Operators, FEM, Differential Equations, High-Performance Computing
Biomedical Imaging: U-Net, VoxelMorph, image segmentation & registration, 4D flow MRI, ITK-SNAP, Paraview
Cardiac Modelling: openCARP, Cobiveco, LDRB, monodomain/bidomain PDEs
Wet Lab: PCR, RT-PCR, SEM, molecular cloning, Agrobacterium transformation, RNA-seq, genotyping
Hardware & CAD: SolidWorks, Blender, digital logic, hardware–software integration
Tools: Linux, Git

Awards & Languages

Awards: STEER Award, NUS Global Industry Insight Programme.
Languages: Mandarin Chinese (native), Wu dialect (native), English (fluent).