

Nana Chang (She/her)

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Biomedical Engineering Student

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TECHNICAL SKILLS

Software: MATLAB, R, Python, C++, Java, GitHub, ImageJ, FIJI, Dragonfly, OpenSim

Mechanical: SolidWorks, AutoCAD, Rapid Prototyping, Stress analysis, Generative design

Electrical: LTspice, Altium, PCB Design, Circuit Analysis/Design, Signal processing

Certifications (UBC): Chemical safety, Biosafety, Radiation safety and protection, WHIMS

EDUCATION

University of British Columbia *Bachelor of Applied Science - Biomedical Engineering*

8/2027

TECHNICAL WORK EXPERIENCE

The City University of Hong Kong & The Chinese University of Hong Kong **9/2025 - Present**
Academic Research Assistant

- Develop scoliotic OpenSim model from X-ray scan to evaluate asymmetric muscle synergy during gait
- Collected and processed EMG and kinematic data from stroke patients for analysis
- Performed clinical assessments to evaluate patient motor function and recovery progress

ExoTechHK, Hong Kong Science Park, Hong Kong **5/2025 – 8/2024**
Biomechanics Analyst

- Analyzed marker-based motion data from lifting activities to quantify joint kinematics and dynamics
- Simulate actuators in OpenSim to validate exoskeleton efficacy in reducing muscle effort
- Processed and interpreted EMG signals and metabolic cost data to quantify exoskeleton performance
- Redesign exoskeleton components with 3D prototyping for enhanced grip functionality and ergonomic

Centre of Aging SMART, Vancouver Coastal Health Research Institute, Vancouver **5/2024 – 8/2024**
Academic Research Assistant

- Trained deep-learning model for image segmentation, achieved 98% accuracy and 71% Dice coefficient
- Fabricated detailed 3D resin prints of trabecular bone structures from micro-CT scan
- Conducted examinations of femur specimens utilizing X-ray to assess bone mineral condition
- Presented findings to academic peers in meetings and created posters to showcase project highlights

The Chinese University of Hong Kong, Hong Kong **5/2022 – 8/2022**
Biochemistry Research Assistant (Volunteer)

- Administered preventative peptide drug treatments on a fly model of traumatic brain injury
 - Operated a High Impact Trauma device to induce TBI in flies and measured Mortality Index at 24 hours
 - Determined optimal trauma level to be 4 strikes as the effective threshold
 - Presented experimental findings to academic peers, showcasing research and analysis
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DESIGN STUDENT TEAM

Biomedical Engineering Student Team (BEST), UBC **9/2024 – 4/2025**
Medical Innovation in Neurotechnology (MINT) Team member

- Optimized EEG-controlled bipedal robot structure with SolidWorks for stability and printability
 - Designed a PCB for the overcurrent protection circuit, ensuring reliable power management
 - Collaborated on integrating EEG signals with a deep learning model to classify signals for movement
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TECHNICAL PROJECT

Portfolio - Showcasing my design team and engineering course projects

Adaptive Swing Footrest for wheelchair, course project 1/2025 – 4/2025

- Designed and prototyped a swing-based footrest mechanism with a pivot joint, spring tension, and a locking mechanism to ensure stability while allowing natural leg motion
- Conducted iterative testing on range of motion, footpad tensioning and locking mechanism
- Integrated material selection and cost analysis to optimize durability, recyclability, and affordability

Motion Monitoring with IMU, course project 1/2024 – 4/2024

- Analyzed cycling motion consistency at different speeds on 6 participants in MATLAB and quantified performance by filtering and standardizing to get root mean square error
- Collected body segment locomotion data with Inertial Measurement Units in smartphones

Automation of Cell Aspiration, course project 1/2024 – 4/2024

- Designed a high precision and accuracy negative pressure control device for cell aspiration
- Built sensing circuit using instrumentation amplifier and pressure sensor for accurate pressure readings
- Verified and validated prototype with elaborative testing on mechanical, electrical, and code assessment
- Assessed risk, failure modes, and requirements testing

Deadlift Augmentation Device, course project 9/2023 – 12/2023

- Directed comprehensive joint moment analysis of deadlifts in MATLAB, using marker-less motion tracking via OpenPose, identifying hip joint as bearing highest load with peak moment of 730 Nm
- Engineered a wearable sensor vest to collect data for posture improvement and injury prevention

Impact Detecting Device, course project 1/2023

- Collectively worked on design of whiplash injuries detecting devices to understand injury biomechanics
- Developed sensor-based method to collect head and neck kinetic impact data

Assistive Grip Device, course project 11/2022

- Coordinated as a group to create an assistive guitar pick grip for paralyzed individual
- Built physical prototypes and Weighted Decision Matrix to assess effective and robust design

Bike lane route, course project 10/2022

- Worked as a team to evaluate and select best bike lanes route in Vancouver based on various criteria
- Determined optimal route meeting needs of majority of stakeholders and ensure robustness

Cardboard chair design, course project 9/2022

- Collaborated collectively on designing a minimalistic compact cardboard chair
- Analyzed needs of stakeholders and generate prototype solutions

VOLUNTEER EXPERIENCE

Yan Chai Hospital, Hong Kong 5/2019 – 8/2019

Volunteer helper

- Educated visiting members of the public on basics of Alzheimer's disease
 - Provided support and assistance to patients, including operating clinical machines as needed
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