Phong Le

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EDUCATION

Duke University Durham, NC

B.S.E. Biomedical Engineering | B.A. Computer Science Anticipated Graduation: May 2026

Honors/Awards: Duke QuestBridge Scholar, Florence Family Scholarship Recipient, Post Grata Award Recipient

Coursework: Machine Learning & Imaging, Diagnostic Imaging, Bioinstrumentation, Signals & Systems, Algo. in Data Science

EXPERIENCE AND PROJECTS

Scalable Machine Learning for Antibiotic Virtual Screening Durham, NC

Computational Drug Discovery Project Aug - December 2025

- Applied transfer learning and fine-tuning to graph neural networks (GNEprop), achieving ROC-AUC 0.936 on 2,560 antibiotic candidates, outperforming baseline models (XGBoost & Chemprop) through optimized training pipelines
- Implemented robust ML validation controls (scaffold-based splits, adversarial y-shuffling) to detect data leakage
- Quantified accuracy vs. compute trade-offs to support efficient model selection in screening pipelines

Arts North Carolina Durham, NC

Data Analytics Project Jan - May 2025

- Collaborated with the Arts NC director & NC DPI to produce research to support an arts education NC Bill H418
- Executed regulatory-compliant data harmonization across 4 state and federal education datasets, normalizing schemas, resolving missing identifiers, and enforcing government privacy law constraints
- Applied machine learning methods to identify disparities in academic performance linked to arts education
- Produced a legislative brief presented to 150+ legislators during Arts Day NC

Electromyography (EMG) Circuit Durham, NC

Bioinstrumentation Project Jan - May 2024

- Designed an analog EMG front-end (instrumentation amplifiers, bandpass filtering) for muscle signal acquisition
- Optimized gain staging and noise rejection to isolate bicep and tricep activations for downstream signal processing

Analog Hearing Aid for Low-Resource Settings Durham, NC

Bioinstrumentation Project Aug - December 2023

- Designed and built a low-cost analog hearing aid prototype (<$30 parts), achieving <2% harmonic distortion, up to 55× gain
- Engineered a dual-passband filter system to amplify key speech frequencies while suppressing non-speech noise
- Analyzed signal fidelity and gain using MATLAB, Python, and oscilloscope measurements
- Validated performance with a 4.4/5 speech intelligibility score across user trials, in compliance with ANSI standards

Automated Computational Antibiotics Modeling Lab Durham, NC

Research Project with Dr. Michael Lynch Jan - May 2023

- Built an automated in silico screening pipeline for antibiotic analogues using molecular dynamics simulations
- Developed a Python-based workflow integrated with ChimeraX, increasing molecular simulation throughput by ~100×
- Applied AlphaFold and RDKit to perform structure-based and cheminformatics analysis on large-scale datasets

LEADERSHIP AND ACTIVITIES

MEDesign Durham, NC

Co-President Jan 2023 - Jan 2024

- Led a 30+ member organization focused on device and digital health projects, coordinating projects & mentorship
- Directed development of an app-linked wearable breathalyzer (end-to-end: BLE hardware, mobile app, data transmission), leading a 5-member team to a minimal viable prototype in 4 months

SKILLS

Machine Learning: Python, Scikit-Learn, RDKit, Pandas, Data Processing, Feature Engineering

Research: Image & Signal Processing, Data Visualization, ODE Modeling, Numerical Simulation, AlphaFold

Embedded & Hardware: PCB Milling, Soldering, Oscilloscopes, BLE (Bluetooth), Arduino, KiCad, 3D Printing

Software & Tools: Jupyter, GitHub, SQL, Firebase, Flutter, Fusion 360