Cuong Q. Pham

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PROFESSIONAL INTERESTS

I have a strong interest in data-driven techniques incorporating signal processing and machine learning methods for healthcare research with the goal of enhancing the digitalization of the computer-aid medical system. I conduct human-based biosignal experiments and analyze multi-modal biomedical datasets associated to different sub-domain studies. **Current Research Focus**: Bridging AI, digital phenotyping, and neuroscience to advance the assessment and intervention of common **mental health disorders**, with a particular focus on scalable solutions for low-resource settings.

EDUCATION

Ritsumeikan University — Shiga, Japan
M.Eng. in Advanced Information Science and Engineering — *2021 – 2023*
- Thesis: Remote Photoplethysmography Assessment Using Deep Learning (Chair: Dr. Ruck Thawonmas)

VNU-HCM University of Technology — HCMC, Vietnam
B.Eng. in Physics Engineering - Biomedical Engineering specialization — *2015 – 2020*
- Remarks: 1st-rank Faculty Honors (2016) | GPA: 3.5/4.0
- Thesis: Investigate Imaginary Limb Movements In Brain Computer Interface Based on Motor Imagery

WORK EXPERIENCE

VinUniversity x VNU HCMIU — Vietnam
Tech-lead Implementation — *Oct 2025 – Jul 2026*
- **Project "CBT"**: *"Neuroplasticity Tracking During Intervention For Depression and Anxiety: A Longitudinal, Cognitive-guided Digital Phenotyping Study"*.
  - ∗ **External Funding (60,000 USD)** Neuroscience Capacity Accelerator for Mental Health 2025 (IBRO & Welcome Trust). **My Role**: Lead proposal writing.
  - ∗ **Collaboration:** VinUniversity, VNU HCMIU, RMIT Vietnam, Nguyen Tri Phuong Hospital, Menthy Clinic, HYPPO Clinic. **My Role:** Project Coordinator
  - ∗ **Responsibilities**: (1) build mobile app with digital CBT intervention; (2) collect 4.5 months longitudinal data on Vietnamese mental health patients (n=60); (3) evaluate neuroplasticity changes throughout intervention.
  - ∗

School of Computer Science, University of Birmingham — Birmingham, UK
Visiting Research Student (Mentor: Dr. Melanie Jouaiti) — *Jul – Sep 2025*
- **Project:** *"Speech-based Depression Detection via Conversational Clinical Assessment"*.
  - ∗ **External Funding (3,500 USD):** IEEE Signal Processing Society. **My Role:** Lead Proposal Writing
  - ∗ **Responsibility**: develop and evaluate a multi-task learning framework for interpretable speech-based depression detection, in case of conversational clinical screening.
  - ∗

VinUni-Illinois Smart Health Center (VISHC), VinUniversity — Hanoi, Vietnam
PhD Student (Supervisor: Dr. Hieu Pham) — *Aug 2024 – now*
- **Project**:*"Towards Improving Longitudinal Digital Phenotyping Representation Framework for Wellbeing Modeling"*. **Funder:** VISHC. **Duration:** Dec 2024 - Jul 2025.
  - ∗ **Responsibilities**: develop and evaluate a novel framework for unified digital phenotypes data formulation to enhance the well-being modeling tasks.
  - ∗

- **Project "NEURAI"**: *"Developing and Implementing Digital Mental Health Assessment Tools in Low-Resource Settings"*. **Funder:** VISHC. **Duration:** Apr - Dec 2025.
    * **Collaboration:** VinUniversity, VNU HCMIU, RMIT Vietnam, Nguyen Tri Phuong Hospital, Menthy Clinics. **My Role:** Tech-lead and Project Coordinator
    * **Responsibilities**: (1) build mobile app for multimodal digital phenotypes acquisition including physiological signals, behavioral indicators, EMA, psychological self-reports; (2) collect short-term monitoring data on Vietnamese mental health patients (n=100).
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School of Biomedical Engineering, VNU-HCM International University
HCMC, Vietnam

Graduate Research Assistant (Advisor: Dr. Huong Ha)
Nov 2023 – Jul 2024

- **Project "BCI"**: *"Investigation on establishing a large database of EEG and video recordings of Vietnamese people in application for intelligent control and primary motor rehabilitation in epileptic patients"*.
    * **Funding:** Vietnam Ministry of Science and Technology (KC-4.0-07/19-25). **Amount:** 19,000 EUR (2020-2024)
    * **Collaboration**: VNU HCMIU, VNU UET, EMOTIV, 175 Military Hospital. **My Role:** Tech-lead @ HCMIU.
    * **Responsibilities:** (1) tailored Motor Imagery experiment and processing pipelines to Vietnamese subjects, benchmark predictive modelings, deployed web apps for neuro-feedback; (2) developed app for data acquisition and real-time mouse control system, integrating into into cross-regional project platform.
    * **Outcomes**: 02 conference talks (BME10, NeuroCoB '24), 01 patent (pending), 01 dataset (pending)

HATO Medical Technologies ApS
Odense, Denmark

Biosignal Researcher
Jun 2022 – Nov 2023

- Job responsibilities
    * **Cardiology Research**: (1) worked closely with cardiologists to establish standardized CVDs labeling outcomes tailored to specific use cases at a local Danish ED; (2) conduct literature reviews for evidence-based decision making on cardiology practice, prepare technical materials and grant proposals/fundings.
    * **Data Pipeline**: (1) collect, preprocess clinical data from public and closed sources; (2) worked closely with software developers to integrate serialization pipeline into the backend architecture of the in-house product.
    * **AI/ML Development**: (1) implement a Cloud-based internal data management system with interactive web app and tested its streamline workflow; (2) evaluate and deployed time-series predictive modeling for abnormalities detection and interpretation; inspected and ensured the solution meet technical requirements.

Biological Engineering Laboratory, Ritsumeikan University
Shiga, Japan

Graduate Research Assistant (Advisor: Dr. Kashihara Koji)
Oct 2021 – Aug 2023

- **Project**: *"A Hybrid Controller for Multiple Drug Infusion in Heart Failure"*. **Duration:** Sep 2021 - Mar 2022
    * **Responsibilities:** (1) develop a hybrid controller to regulate CO and MAP within during drug infusion using ML model with drug inputs; (2) evaluate on a mathematical modeling responses of dogs with heart-failure dataset.
    * **Outcomes**: 01 conference paper (IEEE LifeTech '22)
- **Project**: *"Remote Photoplethymosgraph Assessment Using Deep Learning"*. **Duration:** Apr 2022 - Aug 2023
    * **Responsibilities:** (1) design framework to extract high-quality forehead rPPG signal via autoconder networks; (2) conduct rPPG dataset on Japanese students (n=7) and evaluate HR on different camera configurations; (3) design framework to assess stiffness-based waveform feature via deep 3D CNN.
    * **Outcomes**: M.E. Thesis

GTOPIA Vietnam. Ltd
HCMC, Vietnam

Signal Processing Engineer
Jan – Jun 2020

- Job responsibilities
    * **Wearable Research:** (1) design pipeline for raw data aggregation and hemodynamic signal processing for in-house wearable product; (2) conduct experiments on wristbands's performance under different usage scenarios.
    * **EHR Data Collection:** (1) collaborate with Ho-Chi-Minh-Heart-Institute for large-scale clinical data acquisition; (2) categorize and digitalize health records of administered patients with cardiovascular diseases

Biomedical Electronics Laboratory, Shibaura Institute of Technology   Tokyo, Japan
Research Intern (Advisor: <u>Dr. Shinichiro Kanoh</u>)   *Sep – Nov 2019*

- <u>**Project**</u>: *"Design Motor Imagery Protocol To Adapt ERD/ERS Response."*
  - ∗ **Responsibilities**: conduct experimental analysis on EEG visualization for motor cortex response and how to conduct neuro-feedback during BCI experiment.

Faculty of Applied Science, VNU-HCM University of Technology   HCMC, Vietnam
Undergraduate Research   *Jun 2018 – Mar 2019*

- <u>**Project**</u>: *"Exercise Physiology Application: Cardiac Endurance Training for Students by Stationary Bike".*
  Collaboration: HCMC Institute of Biomedical Physics. **Funder**: FAS, HCMUT. **My Role:** Technical Lead.
  - ∗ **Responsibilities**: (1) to design circuits for workload adjustment adapting to the biker's heart rate; (2) to evaluate VO2max improvement on healthy college students (n=15) over endurance training course.
  - ∗ **Outcomes**: 02 conference talks (SEATUC '19, iCAEP '19), 01 conference paper (ISAS '19)

TEACHING

Graduate Teaching Assistant @ CECS, VinUniversity

- [**Fall 2025**] Introduction to Programming (COMP1010), Computer Vision (COMP3040)
- [**Spring 2025**] Object-Oriented Programming and Data Structures (COMP1020)
- [**Fall 2024**] Computer Vision (COMP3040)

Graduate Teaching Assistant @ CISE, Ritsumeikan University

- [**Fall 2022**] Experiments in Artificial and Natural Intelligence

AWARDS

- [**Aug 2024**] Fully-funded fellowship; by VinUni-Illinois Smart Health Center, VinUniversity.
- [**Aug 2022**] Awarded 2nd prize in Kyoto Startup Weekend Competition; by Techstars.
- [**Mar 2022**] GAKKAI scholarship; by Ritsumeikan University.
- [**Sep 2021**] Fully-funded Monbukagakusho (MEXT) Scholarship; by Japanese Government.

PUBLICATION

Peer-reviewed Conference Paper

- [**C.2**] **C. Pham** and K. Kashihara (2022, March), A Hybrid Controller for Multiple Drug Infusion in Heart Failure using Convolutional Neural Network. *In 2022 IEEE 4th Global Conference on Life Sciences and Technologies (LifeTech) (pp. 340-344).* [<u>link</u>]
- [**C.1**] Nguyen, M. T. D., **Pham, C. Q.**, Nguyen, H. N., Le, K. Q., & Huynh, L. Q. (2022), A Statistical Approach to Evaluate Beta Response in Motor Imagery-Based Brain-Computer Interface. *8th International Conference on the Development of Biomedical Engineering in Vietnam (pp. 203-217).* [<u>link</u>]

TALKS

Conference Presentation

- [**Dec 2024**] Development and Evaluation of Multimodal AI Framework for Mental Health Assessment: A Preliminary Study @ <u>Brain Informatics 2024</u> (Bangkok, Thailand).
- [**Jun 2024**] Evaluation of Cue-based Protocol Implementations in Motor Imagery - based Brain-Computer Interface Experiments @ <u>NeuroCoB/Brainconnects 2024</u> (Putrajaya, Malaysia). [<u>github</u>]
- [**Oct 2019**] Exercise Physiology: Improving Stationary Bike Training Performance Using Heart Rate Variability @ <u>ISAS 2019</u>, (HCMC, Vietnam).
- [**Mar 2019**] Exercise Physiology: Cardiac Endurance Training for Students by Stationary Bike @ <u>SEATUC 2019</u> (Hanoi, Vietnam)

ACADEMIC ACTIVITIES

Reviewer

- 13th International Symposium on Information and Communication Technology (SOICT 2024)
- 10th International Conference in Vietnam on the Development of Biomedical Engineering (BME10)

School Projects

- [**Fall 2022**] WasteWise @ GSISE, Ritsumeikan University
  - Team of 6 collaborate with TH Nürnberg (Germany); develop an AI-based mobile app for trash-bins time collection recommendation in public spaces using crowdsourcing dataset.
  - **Achievement**: Deployed app and evaluated on the pilot data in Shiga and Kyoto city.

- [**Summer 2022**] Pic2Fit @ KYOTO Design Lab, Kyoto Institute of Technology
  - Designed a proof-of-concept virtual clothes fitting application tailored for small shops in Kyoto, Japan.
  - **Achievement**: Awarded at Kyoto Startup Weekend Competition.

- [**Fall 2018**] Stationary Bike @ VNU-HCM University of Technology
  - Designed circuits for workload adjustment adapting to the biker's heart rate; collaborated with HCMC Institute of Biomedical Physics to evaluated VO2max improvement on students over endurance training course.
  - **Achievement**: The system is integrated into laboratory experiment course for students in afterwards cohorts.

- [**Spring 2017**] Pet Feeder
  - Tech-lead freelance team to design the low-cost automated pet-feeding system; conducted mechanical design and material 3D-printing, developed electrical circuits and platform for IoT user control.
  - **Achievement**: Delivered MVP to the reserved customers.

Communitiy Involvement

- [**Dec 2024**] Conference Staff @ ACML 2024 (Hanoi, Vietnam).
- [**Jan '203**] Teaching Staff @ Ritsumeikan Junior High (Kyoto, Japan).
- [**Oct 2022**] Conference Staff @ IEEE/RSJ IROS 2022 (Kyoto, Japan).

SELECTED SKILLS

- **Programming**: Python, JavaScript, TypeScript, MATLAB, R, SQL, C#, Bash/Linux
- **Machine Learning**: OpenCV, Scikit-learn, LightGBM, XGBoost, Keras, PyTorch, Lightning
- **System Development**: Web (React, CSS), Mobile (React Native), Backend (Flask, FastAPI)
- **Cloud**: AWS (S3, EC2, Lambda), GCP
- **Databases**: MySQL, PostgreSQL, MongoDB, Firebase
- **Tools**: Git, Docker, Jira, Streamlit, Lab Streaming Layer
- **Miscellaneous**: Data Analysis (scipy, pandas, ggplot2, dplyr), Bio-Signal Experimentation (ECG, EEG, PPG, EMG, wearable/bio-sensors), Signal Processing (spectral & time-frequency analysis, transformations, filtering), Circuit (Arduino, Raspberry Pi)
- **Language**: Vietnamese (native), English (professional, IELTS 7.0)

REFERENCE

Hieu Pham, Ph.D.
Assistant Professor, College of Engineering & Computer Science (CECS) &
Scientific Director, Entrepreneurship Lab (E-lab),
PI at VinUni-Illinois Smart Health Center, VinUniversity.
Email: hieu.ph@vinuni.edu.vn

Ha Thi Thanh Huong, Ph.D.
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Chair, Department of Tissue Engineering and Regenerative Medicine
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