Cuong Pham

cuongquocpham151@gmail.com | cuongpham281 | cqpham28 | https://cqpham28.github.io

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 in neurology, cardiology, and digital remote monitoring.

EDUCATION

Ritsumeikan University — Shiga, Japan
M.Eng. in Advanced Information Science and Engineering — *2021 – 2023*

- Fully-funded MEXT Scholarship by Japanese Government

VNU-HCM University of Technology — HCMC, Vietnam
B.Eng. in Physics Engineering — Biomedical Engineering specialization — *2015 – 2020*

- 1st-rank Faculty Honors (2016) | GPA: 3.5/4.0

WORK EXPERIENCE

VinUni-Illinois Smart Health Center, VinUniversity — Hanoi, Vietnam
PhD Candidate (Advisor: Dr. Hieu Pham, Dr. Huong Ha) — *Aug 2024 – now*

- **Mental Health Research**
  - Being Research Coordinator for a team of 10 multidisciplinary experts and graduate students.
  - Collaborate with multiple hospitals & clinics in Vietnam for a large-scale digital-phenotying cohorts.
  - Developed a Cloud-based web app platform for seamless wearable data acquisition and retrieval.

School of Biomedical Engineering, VNU-HCM International University — HCMC, Vietnam
Research Assistant — *Nov 2023 – Jul 2024*

- **Brain Computer Interface (BCI) Research**: designed and calibrated experiment protocol; supported data acquisition and management process; taught EEG signal processing for undergrad students.
- **Data Modeling**: serialized and processed the collected in-house datasets; developed ML pipeline for predictive modeling tasks; conducted performance benchmarking with other data sources; deployed and maintained web apps for Cloud storage, performance response analysis and data visualization.
- **Online-BCI**: collaborated with the software developers to build a customized desktop app for BCI data acquisition and response controller; deployed and evaluated user-specific calibrated modeling for real-time mouse control system; conducted inspection process to integrate the platform into cross-regional collaborative project (KC4.0-MOST).

HATO Medical Technologies ApS — Odense, Denmark
Machine Learning Engineer — *Jun 2022 – Nov 2023*

- **Cardiology Research**: worked closely with cardiologists and health-tech startup stakeholders to establish standardized clinical labeling protocols tailored to specific use cases at a local Danish emergency department focusing on final outcomes for cardiovascular diseases ; conducted literature reviews for evidence-based decision making, wrote technical documentation, prepared research materials and wrote grant proposals/fundings.
- **Data Pipeline**: collected and handled data from public repositories and clinical sources. Implemented a scalable data processing pipeline, including data cleaning, and alignment across sources. Collaborated with software developers to integrate a data serialization pipeline into the backend architecture of the in-house product.
- **AI/ML Development**: implemented a Cloud-based internal data management system with interactive web app and tested its streamline workflow. Monitored and evaluated time-series predictive modeling; deployed models for real-time abnormalities detection and interpretation; inspected and ensured the solution meet technical requirements.

GSISE, Ritsumeikan University Shiga, Japan
M.Eng Research Assitant *Oct 2021 – Aug 2023*

- **Drug Infusion Research**: developed a hybrid controller to regulate cardiac output and mean arterial pressure within during drug infusion using ML model with short-time previous drug inputs; evaluated on a mathematical modeling responses of dogs with heart-failure dataset.
- **RPPG Signal Quality Enhancement**: designed pipeline to track landmarks on customized forehead region-of-interest, using combination of unsupervised optical models and deep auto-encoder network to improve signal-to-noise ratio; evaluated on public remote-photoplethysmograph datasets.
- **RPPG Experiments**: collected data (5 healthy subjects with different camera settings & postures); designed platform to synchronize facial video and blood volume pulse signal; evaluated heart rate benchmarks among different configurations with unsupervised methods and statistical analysis.
- **RPPG Feature Assessment**: investigated the reliability of waveform feature related to cardiac aging/stiffness by using a real-time Face-Mesh tracking with deep learning model and a customized morphology extraction; evaluated on a public well controlled rPPG dataset.

GTOPIA Vietnam. Ltd HCMC, Vietnam
Signal Processing Intern (Advisor: Dr. Liem Huynh) *Jan – Jun 2020*

- **Wearable Research**: designed pipeline with API for raw data aggregation from in-house wearable product; designed signal processing pipeline for vital-sign hemodynamic monitoring; conducted experiments on commercial wristbands's performance under different usage scenarios.
- **Data Collection**: collaborated with Ho-Chi-Minh-Heart-Institute for large-scale clinical data acquisition. Processed, categorized, and digitalized health records of administered patients with cardiovascular diseases.

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

- **EEG Experiment**: involved in data collection activities for Auditory and Motor Imagery studies; conducted experimental analysis on EEG visualization for motor cortex response and how to conduct neuro-feedback. Revised experiment procedure for the Bachelor Thesis.

PUBLICATION

Peer-reviewed Conference Paper

- **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).* [paper] [github]
- 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).* [paper] [github]
- **Pham, Q. C.**, Nguyen, T. D. M., Le, C. D., Khai, Q., & Le, Q. L. H. (2020, May). Exercise Physiology: Improving Stationary Bike Training Performance Using Heart Rate Variability. *Proceedings of International Symposium on Applied Science 2019 (Vol. 3, pp. 100-108).*

Thesis

- **Cuong Pham**, Remote Photoplethysmography Assessment Using Deep Learning (2023, Aug), *Master Thesis @ Graduate School of Information Science and Engineering, Ritsumeikan University.*

TALKS

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

- **[Oct 2019]** Research into the relationship between cardiac responses and neural activity to improve classification of EEG-based imaginary action (iCAEP 6, Thai Nguyen, Vietnam).
- **[Mar 2019]** Exercise Physiology: Cardiac Endurance Training for Students by Stationary Bike (SEATUC 2019, Hanoi, Vietnam)

ACADEMIC ACTIVITIES

Teaching Assistant

- **[Fall 2024]** Computer Vision @ CECS, VinUniversity
  - Prepared materials, instructed and evaluated student programming practice on computer vision topics.
- **[Fall 2022]** Experiments in Artificial and Natural Intelligence @ CISE, Ritsumeikan University
  - Instructed biosensors experiments, calibrated and maintained lab's equipments/softwares.

School Projects

- **[Sep 2022 – Jan 2023]** 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.
  - **Results** are evaluated on the pilot data in Shiga and Kyoto city.
- **[Aug 2022]** Pic2Fit @ KYOTO Design Lab, Kyoto Institute of Technology
  - Design a proof-of-concept virtual clothes fitting application tailored for small shops in Kyoto, Japan.
  - **Awarded** 2nd prize in Kyoto Startup Weekend Competition; by Techstars.
- **[Sep 2018 – Mar 2019]** 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.
  - **Presented** results at ISAS 2019 conference; system are intergrated into laboratory experiment course.
- **[Mar – Jun 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.
  - **Delivered** MVP to the reserved customers.

Communitiy Involvement

- **[Jan 2023]** Teaching Assistant @ Ritsumeikan Junior High
  - Organized activities and trained language skills for Japanese junior students to join on-stage competition.
- **[Oct 2022]** Technical Staff @ IEEE/RSJ IROS 2022
  - Setup venue logistics and PCs; in charge of information desk and Webinar operations for Chair session.
- **[Sep 2020 - Apr 2021]** Founder EEG Group @ VNU-HCM University of Technology
  - Hosted a weekly laboratory session about PSG-sleep studies; taught Matlab tutorials for students.

Mentoring Students

- **Tuong Nguyen H.**, now Research Staff @ VNU-HCM International University (Vietnam).
- **Hidetake Kondo**, now Software Developer @ e-Jan Networks Co. (Japan).
- **Ha Nguyen L. N.**, now Biomedical Engineer @ Cho Ray Hospital (Vietnam).

SELECTED SKILLS

- **Programming**: Python, MATLAB, Linux, R, SQL, Javascript, C#
- **Machine Learning**: OpenCV, Scikit-learn, LightGBM, XGBoost, Keras, Pytorch, Lightning
- **Tech Stacks**: Database (MySQL, MongoDB, Firebase), Webapp (Streamlit, Flask), Mobile (React Native), Cloud AWS (S3, EC2, Lambda), Tools (Git, Docker, Jira)
- **Miscellaneous**: Data Analysis (scipy, pandas, ggplot2, dplyr), Bio-Signal Experimentation (ECG, EEG, PPG, wearable/bio-sensors), Signal Processing (spectral & time-frequency analysis, transformation [SVD, PCA, ICA], filtering IIR/FIR), Circuit (ESP32, Arduino, Raspberry Pi, IoT sensors)
- **Language**: Vietnamese (native), English (fluent)

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.
Head of Brain Health Lab &
Chair, Department of Tissue Engineering and Regenerative Medicine
School of Biomedical Engineering, International University
Vietnam National University in Ho Chi Minh city.
Email: htthuong@hcmiu.edu.vn

Stefan K. Johansen
COO, HATO Medical Technologies,
Partners & Board Members, Black Capital Ventures.
Email: skj@hatomedicaltechnologies.com