Hieu Pham, Ph.D.

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Associate Director, VinUni-Illinois Smart Health Center, VinUniversity
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Google Scholar (540 citations) https://shorturl.at/dwJW1

Education

September 2019 — **Ph.D. in Computer Science**
Toulouse Computer Science Research Institute (IRIT), University of Toulouse, France.
Dissertation: *"Human Action Recognition in RGB-D Videos based on Deep Neural Networks"*.

July 2015 — **Bachelor of Engineering in Industrial Informatics**
Center for Training of Excellent Students (CTES), Hanoi University of Science and Technology (HUST), Vietnam.
Thesis: *"Obstacle Detection in Indoor Environment for Visually Impaired People"*, Université Grenoble Alpes, France.

Research Interests

Computer Vision, Deep Learning, Medical Image Analysis, Bioimaging, Healthcare Applications

Academic & Professional Experience

Otc. 2022 ÷ Present — **Assistant Professor**, College of Engineering and Computer Science, VinUniversity

- Instructor, ELEC2022
- Instructor, COMP1020
- Instructor, COMP1010

Nov. 2021 ÷ Jun. 2021 — **Associate Director**, VinUni-Illinois Smart Health Center, VinUniversity

Sep. 2020 ÷ Jun. 2021 — **Affiliated Faculty, Assistant Professor**, CECS, VinUniversity

- Supervise and mentor research assistants at the Smart Health Center.
- Construct syllabus and deliver lectures for the "*Introduction to Machine Learning*" course (CECS1020) – https://vinuni.instructure.com/courses/460.
- Conduct research in Medical Imaging Analysis and AI-based Smart Healthcare.
- Organize seminar series on AI and Smart Healthcare.
- Promote scientific cooperation between VinUni and other research institutions (VinBigdata, HUST, VNU, EFFL).

Oct. 2019 ÷ Oct. 2021 — **Research Scientist & Head of Fundamental Research**, Department of Medical Center, VinBigdata

- Being in charge of fundamental research on AI and Medical Imaging, leading the research team to produce high-quality, international standard research outputs (https://vindr.ai/).
- Train and supervise AI research interns (15 peoples)
- Construct and normalize large-scale medical datasets (X-ray, CT, MRI, etc).
- Design and implement Computer Vision and Deep Learning approaches to solving particular medical imaging problems related to detection, segmentation and classification in medical imaging.
- Produce top tier technical/clinical publications and transfer ML/DL models into products.

Oct. 2016 ÷ Sep. 2019 — **Ph.D. Researcher** at the Toulouse Computer Science Research Institute (IRIT), University of Toulouse & Cerema Research Center, Toulouse, France.

- Conducted studies on video-based human action recognition using deep learning networks.
- Proposed new 3D motion representations and deep learning frameworks for action analysis.

Nov. ÷ Dec. 2017 — **Visiting Ph.D. Student** at the Applied Artificial Intelligence Research Group, University Carlos III of Madrid, Madrid, Spain.

- Designed and optimized very deep CNNs for image recognition tasks.

Nov. 2014÷ May 2015	**Research Intern** in the AIR-COBOT project, led by AIRBUS Group and ICA Research Institute, Albi, France. • Analyzed 3D point cloud for detection and characterization of defects on airplane surface.
July ÷ Oct. 2015	**Research Engineer** at the MICA International Research Center, Hanoi, Vietnam. • Conducted research on object detection, 3D video analysis, and scene understanding.
Feb. ÷ June 2015	**Research Intern** at the AGIM Laboratory, Université Grenoble Alpes, Grenoble, France. • Developed an obstacle detection and warning system for visually impaired people based on electrode matrix and mobile Kinect.

Teaching experience

Spring 2021	**Instructor** at the CECS, VinUni. • Course: *"Introduction to Machine Learning – CECS1020"* • Program: CECS undergraduate • Responsibilities: Developed syllabus and delivered lectures for 50 CECS VinUni students. • Course syllabus is available at https://vinuni.instructure.com/courses/460
Fall 2019	**Guest Lecturer**, University Carlos III of Madrid, Spain. • Course: *"An introduction to Deep Learning for Image and Video Interpretation"* • Program: Graduate, Master's Degree in Computer Science and Technology • Responsibilities: Developed and delivered a series of lectures on Deep Learning for Video Analysis, including assignments and exam questions for 30 Master's degree students. • Course syllabus is available at https://cutt.ly/KxVTcd9
Fall 2018	**Teaching Assistant**, University of Toulouse, France • Course: *"Introduction to Programming and Algorithms in Python"* • Program: CS undergraduate • Responsibilities: Delivered weekly one-hour lectures (30 students) and one weekly three hour laboratory session (15 students) for two semesters. Integrated Problem-Based Learning (PBL) activities during the course.

Students Advising/Mentoring

Mar. 2022	Mentor for **Phan Nhat Huy**, VinUni undergraduate student (EE). Second Best Poster Presentation, CECS Day, Spring 2022
Mar. 2022	Mentor for **Mai Quang Tuan**, VinUni undergraduate student, (EE). Best oral presentation, CECS Day, Spring 2022
Mar. 2022	Mentor for **Phan Thi Hien Chi**, VinUni undergraduate student (EE). Best poster presentation, CECS Day, Spring 2022
Jul. 2020	Mentor for **Tung T., Le**, VNU-UET undergraduate student. Project: *"Develop and evaluate a deep learning system for the classification of chest diseases from X-ray images"*. Research outcome: A journal publication on Neurocomputing
Feb. 2021	Mentor for **Hieu T., Nguyen**, HUST undergraduate student. Project: *"Develop and evaluate a deep learning system for bone X-ray interpretation"*. Research outcome: A new benchmark spine X-ray dataset (10,468 images) and an accepted paper to MICCAI conference (A^* conference on medical imaging)
Jan. 2021	Mentor for **Hoang C., Nguyen**, KAIST undergraduate student (Gold IMO 2017). Project: *"Develop and evaluate a deep learning system for rib labeling from PA view CXR images"*. Research outcome: A new, annotated CXR dataset for individual rib segmentation and an accepted paper to International Conference on Medical Imaging with Deep Learning 2021
Mar. 2021	Mentor for **Dung V., Do**, HUST undergraduate student Project: *"Classification of body parts on X-ray images"*. Research outcome: An accepted paper to ICCV Workshop 2021
Mar. 2021	Mentor for **Thanh T., Tran**, HUST undergraduate student. Project: *"AI solution for detecting abnormalities on pediatric chest X-ray images"*. Research outcome: A benchmark CXR dataset for pediatric abnormal detection and an accepted paper to ICCV Workshop. 2021

Fellowship and Awards

Sep. 2022	**AI Awards 2022**
Sep. 2021	**DAAD Fellowship 2021** for outstanding researcher in AI and Medical Imaging Research, Federal Ministry of Education and Research (Germany)
Sep. 2019	**Rank 1st** in the CheXpert competition, organized by Stanford University. More details about this project can be found at VnExpress.
Jul. 2018	**Silver Medal** (top **3%** accuracy) for the TGS Salt Segmentation Challenge, Kaggle competition.
Sep. 2016	**Ph.D. Fellowship** for an outstanding candidate from the Cerema Research Center, France.
Jan. 2015	**Doctoral Travel Scholarship** from L'Université Fédérale Toulouse Midi-Pyrénées and Écoles des Docteurs, Toulouse, France.
Sep. 2015	**Research Internship Scholarship** from the ICA Research Institute, France.
Jan. 2015	**Graduate Internship Scholarship** from the Université Grenoble Alpes, France.

Research Grants

Contributions to Ongoing Funded Research

Aug. 2021 – May 2023 | VAIPE: AI-assisted IoT-enabled smart, optimal, and Protective hEalthcare monitoring and supporting system for Vietnamese

- Principal Investigators: Minh Do (VinUni/UIUC), Hieu H. Pham (VinUni), Phi Le Nguyen (HUST), Hung Nguyen (HUST), My Thai (University of Florida), Duc Tran (University of Massachusetts).
- Role: Co-author. I provided preliminary research idea and wrote the grant with co-authors.
- Total funding: $220,000

Aug. 2019 – May 2021 | Building large-scale medical imaging datasets for developing AI-based computer-aided detection/diagnosis systems.

- Principal Investigators: Ha Q. Nguyen (VinBigdata), Hieu H. Pham (VinBigdata), Linh T. Le (HMU Hospital), Lam Khanh (108 Hospital).
- Role: Co-author. I defined the data collection and normalization process.
- Total funding: $200,000

Aug. 2019 – May 2021 | Application of Artificial Intelligence in Medical Image Analysis

- Principal Investigators: Lam Khanh (108 Hospital), Ha Q. Nguyen (VinBigdata), Hieu H. Pham (VinBigdata)
- Role: Co-author. I developed AI solutions for several modalities (chest X-ray, MSK, chest CT)
- Total funding: $120,000

Contributions to Submitted Grants

Aug. 2019 – May 2021 | Explainable Artificial Intelligence (AI) for Diagnosis of 3D Medical Images

- Principal Investigators: Minh Do (VinUni), Ha Q. Nguyen (VinBigdata), Hieu H. Pham (VinBigdata), Dorina Thanou (EPFL), Pascal Frossard (EPFL)
- Role: Co-author. I provided preliminary research idea and wrote the grant with co-authors.

Languages

Native Vietnamese speaker and fluent in both French and English.

Scientific Publications

Journal publications

[J-11] Ngoc Huy Nguyen, Ha Quy Nguyen, Nghia Trung Nguyen, Thang Viet Nguyen, Hieu Huy Pham, Tuan Ngoc-Minh Nguyen. *"A clinical validation of VinDr-CXR, an AI system for detecting abnormal chest radiographs"* – **Frontiers in Digital Health (2022) | Accepted** (.pdf)

[J-10] Ha Q. Nguyen, Khanh Lam, Linh T. Le, **Hieu H. Pham**, Dat Q. Tran, Dung B. Nguyen, Dung D. Le, Chi M. Pham, Hang T. T. Tong, Diep H. Dinh, Cuong D. Do, Luu T. Doan, Cuong N. Nguyen, Binh T. Nguyen, Que V. Nguyen, Au D. Hoang, Hien N. Phan, Anh T. Nguyen, Phuong H. Ho, Dat T. Ngo, Nghia T. Nguyen, Nhan T. Nguyen, Minh Dao, Van Vu. *"VinDr-CXR: An open dataset of chest X-rays with radiologist's annotations"* – **Nature Scientific Data (2022) | Accepted**

(.pdf)

[J-9] Binh T. Dao,Thang V. Nguyen, Hieu H. Pham, Ha Q. Nguyen. *"Phase recognition in contrast-enhanced CT scans based on deep learning and random sampling"* – **Medical Physics (2022)** (.pdf)

[J-8] **Hieu H. Pham**, Tung T. Le, Dat Q. Tran, Dat T. Ngo, Ha Q. Nguyen A. Velastin. *"Interpreting chest X-rays via CNNs that exploit disease dependencies and uncertainty labels"* – **Neurocomputing**

[J-7] **Huy-Hieu Pham**, Houssam Salmane, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"A Unified Deep Framework for Joint 3D Pose Estimation and Action Recognition from a Single RGB Camera"* – Special Issue Camera as a Smart-Sensor (V.20,7), **Intelligent Sensors**

[J-6] **Huy-Hieu Pham**, Houssam Salmane, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"Spatio-Temporal Image Representation of 3D Skeletal Movements for View-Invariant Action Recognition with Deep Convolutional Neural Networks"* – Special Issue "Deep Learning -Based Image Sensors", **Intelligent Sensors**

[J-5] **Huy-Hieu Pham**, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"Learning to Recognize 3D Human Action from A New Skeleton-based Representation Using Deep Convolutional Neural Networks"* – The **IET Computer Vision Journal (IET 2018)** | Accepted

[J-4] **Huy-Hieu Pham**, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"Exploiting Deep Residual Networks for Human Action Recognition from Skeletal Data"* – The **Computer Vision and Image Understanding Journal**, Vol. 170 (51-66), 2018 **(CVIU 2018)** | .pdf

[J-3] Igor Jovancevic, **Huy-Hieu Pham**, Jean-José Orteu, Rémi Gilblas, Jacques Harvent, Xavier Maurice, Ludovic Brèthes. *"3D Point Cloud Analysis for Detection and Characterization of Defects on Airplane Exterior Surface"* – **Journal of Nondestructive Evaluation**, Vol. 36 (74), 2017 **(JNE 2017)** | .pdf

[J-2] Igor Jovancevic, **Huy-Hieu Pham**, Jean-José Orteu, Rémi Gilblas, Jacques Harvent, Xavier Maurice, Ludovic Brèthes. *"Détection et Caractérisation de Défauts de Surface par Analyse des Nuages de Points 3D Fournis par Un Scanner"* - **La revue Instrumentation, Mesure, Métrologie**, Vol. 16 (1-4), 2017 **(I2M 2017)** | .pdf

[J-1] **Huy-Hieu Pham**, Thi Lan Le, and Nicolas Vuillerme. *"Real-Time Obstacle Detection System in Indoor Environment for Visually Impaired Sensor Using Microsoft Kinect"* – **The Journal of Sensor**, Vol. 11 (1-13), 2016 **(SCIE 2016)** | .pdf

Peer-reviewed conference publications

[C-9] Nang Hung Nguyen, Phi Le Nguyen, Duc Long Nguyen, Trung Thanh Nguyen, Thuy Dung Nguyen, Thanh Hung Nguyen, Huy Hieu Pham, Truong Thao Nguyen. *"FedDRL: Deep Reinforcement Learning-based Adaptive Aggregation for Non-IID Data in Federated Learning"* – **The 51st International Conference on Parallel Processing (ICPP 2022)**.

[C-8] Huyen TX Nguyen, Sam B Tran, Dung B Nguyen, **Hieu H. Pham**, and Ha Q Nguyen. *"A novel multi-view deep learning approach for BI-RADS and density assessment of mammograms Convolutional Neural Networks"* – **The 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (2022 IEEE EMBC)** .

[C-7] Thanh T. Tran, **Hieu H. Pham**, Thang V. Nguyen, Tung T. Le, Hieu T. Nguyen, Ha Q. Nguyen. *"Learning to Automatically Diagnose Multiple Diseases in Pediatric Chest Radiographs Using Deep Convolutional Neural Networks"* – **2021 IEEE/CVF International Conference on Computer Vision Workshops (ICCV Workshop 2021)**.

[C-6] Thanh T. Tran, **Hieu H. Pham**, Thang V. Nguyen, Tung T. Le, Hieu T. Nguyen, Ha Q. Nguyen. *"Learning to Automatically Diagnose Multiple Diseases in Pediatric Chest Radiographs Using Deep Convolutional Neural Networks"* – **2021 IEEE/CVF International Conference on Computer Vision Workshops (ICCV Workshop 2021)**.

[C-5] **Hieu H. Pham**, Dung V. Do, Ha Q. Nguyen. *"DICOM Imaging Router: An Open Deep Learning Framework for Classification of Body Parts from DICOM X-ray Scans"* – **2021 IEEE/CVF International Conference on Computer Vision Workshops (ICCV Workshop 2021)**.

[C-5] Hoang C. Nguyen, Tung T. Le, **Hieu H. Pham**, Ha Q. Nguyen. *"VinDr-RibCXR: A Benchmark Dataset for Automatic Segmentation and Labeling of Individual Ribs on Chest X-rays"* – **Medical Imaging with Deep Learning (MIDL 2021)**.

[C-4] Hieu T. Nguyen, **Hieu H. Pham**, Nghia T. Nguyen, Ha Q. Nguyen, Minh Dao, Van Vu. *"A deep learning framework for spinal lesions detection and classification from radiographs"* – **International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2021).**

[C-3] **Hieu H. Pham**, Tung T. Le, Dat Q. Tran, Dat T. Ngo, Ha Q. Nguyen. *"Interpreting chest X-rays via CNNs that exploit disease dependencies and uncertainty labels"* – Proceedings of **Medical Imaging with Deep Learning** (**MIDL 2020**) | .pdf

[C-2] **Huy-Hieu Pham**, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"Skeleton to Color Map: A Novel Representation for 3D Action Recognition with Inception Residual Networks"* – The 25th **IEEE International Conference on Image Processing** 7-10 October, 2018, Athens, Greece (**ICIP 2018**) | .pdf

[C-1] **Huy-Hieu Pham**, Louahdi Khoudour, Alain Crouzil, Pablo Zegers, Sergio A. Velastin. *"Learning and Recognizing Human Action from Skeleton Movement with Deep Residual Neural Networks"* – The 8th **International Conference of Pattern Recognition Systems**, 11-13 July, 2017, Madrid, Spain (**ICPRS 2017**) | .pdf

Preprints & under submissions

For a complete list of publications: Google Scholar (445 citations, h-index = 10, h-10 index = 10 on November 2, 2022).

Industrial Experience

2015 - 2016 Research Intern, Airbus Group, Toulouse, France.

PATENTS

Ha Q. Nguyen, Long T. Dam, **Hieu H. Pham**, Dung N. Ba, Dat T. Ngo. *"PACS-AI: Integrating AI-based medical image management solution to support clinicians in real-time imaging diagnosis"* - Intellectual Property Office of Viet Nam (IP Viet Nam). Pending.

Ha Q. Nguyen, **Hieu H. Pham**, Dung N. Ba, Dat T. Ngo. *"VinDr-ChestXR: A CAD system for chest X-ray interpretation"* - Intellectual Property Office of Viet Nam (IP Viet Nam). Pending.

Ha Q. Nguyen, **Hieu H. Pham**, Dung N. Ba, Nguyen Trung Hieu. *"VinDr-Mammo: A CAD system for mammography interpretation"* - Intellectual Property Office of Viet Nam (IP Viet Nam). Pending.

Ha Q. Nguyen, **Hieu H. Pham**, Dung N. Ba, Nguyen Trung Hieu. *"VinDr-SpineXR: A CAD system for abnormality detection on spine X-ray"* - Intellectual Property Office of Viet Nam (IP Viet Nam). Pending.

REAL-WORLD APPLICATIONS

I am a co-author of **four software applications** (VinDr-ChestXR, VinDr-ChestCT, VinDr-SpineXR and VinDr-LiverCT) related to the application of Artificial Intelligence in Medical Image Analysis.

Review Activities

Reviewer, IEEE Journal of Selected Topics in Signal Processing
Reviewer, IEEE/CVF Conference on Computer Vision and Pattern Recognition 2022 (CVPR2022)
Reviewer, Journal of Electronic Imaging
Reviewer, European Conference on Computer Vision (ECCV 2022)
Reviewer, International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2022)
Reviewer, IEEE Journal of Biomedical and Health Informatics (JBHI)
Reviewer, Nature Scientific Reports
Reviewer, IET Computer Vision Journal (IET-CVI)
Reviewer, International Conference on Computer Vision (ICCV 2021)

Invited Talks, Workshops & Summer School

Dec. 2018 Invited speaker, *"Applied Machine Learning Days"* at the French Institute of Science and Technology for Transport, Development and Networks (IFSTTAR), Paris, France.

Nov. 2017 Invited speaker, *"An Introduction to Deep Learning for Image and Video Interpretation"* at the University Carlos III of Madrid (UC3M), Madrid, Spain.

July 2018 *"The 2nd International Summer School on Deep Learning"*, Genova, Italy.

DEC. 2017 *"Workshop on Face, Action and Behavior Recognition"*, Télécom ParisTech, Paris, France.

June 2018 *"Deep Learning Workshop"*, Toulouse Computer Science Research Institute (IRIT), Toulouse, France.

Scientific Societies

IEEE member
Member of the IEEE Computer Society and the French Information, Signal, Image et Vision Society.

References

Minh Do, ScD, UIUC

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