

Duong Hung PHAM

Ph.D., Asso. Prof., Paul Sabatier University - Toulouse 3



Nationality: Vietnamese-French

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Research

Publications and communications

Complete list: <https://scholar.google.com/citations?hl=en&user=bcrdGkUAAAAJ>

Research interests

- ★ Inverse problems in signal and image processing, machine learning.
- ★ Applications in medical imaging (ultrasound, fMRI, etc.).
- ★ Time-frequency/ time-scale analysis, reassignment, synchrosqueezing, approximation theory.
- ★ AM/FM decompositions, instantaneous frequency, analytic signal.

Research projects

- 2023 – 2027 **SONATINE** – French National “ANR JCJC” Grant *Coordinator. Principal Investigator. Individual Research Grant. Website: <https://www.irit.fr/SONATINE/>*
- 2023 – 2027 **STRATUM** – Inserm “AVIESAN” Grant *Coordinator. Principal Investigator.*
- 2023 – 2027 **CAVIAR** – French National ANR “PRC” Grant *Member. Coordinator: B. Gilles.*
- 2023 – 2027 **CUBE** – French National ANR “PRCE” Grant *Member. Coordinator: S. Silva.*
- 2021 – 2021 **CNRS Unique** project (Young Researcher Grant) *Coordinator. Principal Investigator. Individual Research Grant*
- 2021 – 2022 “Echange d’expertises” project, France Life Imaging (FLI) *Coordinator. Principal Investigator.*
- 2021 – 2022 **STIC AMSUD** project *Member*

Supervision

• Postdoctoral Fellows

- ◇ ... (2022 –).

• Ph.D. Students

- ◇ Floquet Arthur (2022 –). **Co-supervisors:** D. Kouamé (IRIT/UPS) and E. Soubies (IRIT/ENSEEIH).
- ◇ Vassili PUSTOVALOV (2021 –). **Co-supervisor:** D. Kouamé (IRIT/UPS)
- ◇ Nwigbo Kenule Tuador (2019 – 2023). **Co-supervisors:** D. Kouamé and A. Basarab (IRIT/UPS).
- ◇ Thi-Hoang-Yen Tran (2019 – 2020). **Co-supervisors:** Diener Francine, Laboratoire J.-A. Dieudonné, Université de Nice – Sophia Antipolis.

- **M2/Engineer Students**

- ◇ Rick AGATE (2023).
- ◇ Jessy KHAFIF (2023). **Co-supervisor:** D. Kouamé (IRIT/UPS).
- ◇ Smati WISSEM (2023). **Co-supervisors:** D. Kouamé (IRIT/UPS) and J. Michetti (dentist).
- ◇ Camille Billouard (2022). **Co-supervisors:** D. Kouamé (IRIT/UPS) and J. Michetti (dentist).
- ◇ Floquet Arthur (2022). **Co-supervisor:** T. Oberlin (ISÆ/SUPAREO).
- ◇ Guillaume VIVES (2021). **Co-supervisor:** D. Kouamé (IRIT/UPS).
- ◇ Vassili PUSTOVALOV (2021). **Co-supervisor:** D. Kouamé (IRIT/UPS).

Colaborations (present and past)

- Sylvain Meignen, *LJK, Grenoble, France.*
- Marcelo Alejandro Colominas, *researcher, CONICET and UNER, Argentina.*
- Adrian Basarab, *IRIT, Toulouse, France.*
- Denis Kouamé, *IRIT, Toulouse, France.*
- Jean-Pierre Remenieras, *UMR Inserm U 1253 – iBrain, Tours, France.*
- Sylvain Faisan, *Icube, Strasbourg, France.*
- Céline Meillier, *Icube, Strasbourg, France.*
- Anne Giersch, *INSERM 1114, Strasbourg, France.*
- Eduardo Marques-Carneiro, *INSERM 1114, Strasbourg, France.*

Refereeing

- ◇ IEEE Transactions on Signal Processing (TSP)
- ◇ IEEE Transactions on Computational Imaging (TCI)
- ◇ IEEE Signal Processing Letters (SPL)
- ◇ IEEE Communications Letters (CL)
- ◇ IEEE Transactions on Industrial Informatics (TII)
- ◇ IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC)
- ◇ Elsevier – Signal Processing (SP)
- ◇ Frontiers in Applied Mathematics and Statistics
- ◇ International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI)
- ◇ Mathematics and Computers in Simulation
- ◇ Digital Signal Processing (DSP)
- ◇ Multimedia Tools and Applications
- ◇ Conférences internationales : ICAPS, EUSIPCO, ISBI, IUS, GRETSI, BIBE, etc, ...

International Journal Papers

Submitted papers

- [17] N. Ouzir, V. Pustovalov, **D. H. Pham**, D. Kouamé, J.-C. Pesquet, Joint Blood Flow and Tissue Motion Estimation in Doppler Ultrafast Ultrasound Imaging, *Preprint*, October 2022.
- [16] M. A. Colominas, S. Meignen, and **D. H. Pham**, “Adaptive Ridge Detection and Mode Reconstruction Based on STFT Phase Information,” *Preprint*, October 2022.

Published papers

- [15] A. Floquet, S. Dutta, E. Soubies, **D. H. Pham** and D. Kouame, "Automatic Tuning of Denoising Algorithms Parameters Without Ground Truth," in *IEEE Signal Processing Letters*, vol. 31, pp. 381-385, 2024.
- [14] D. Nguyen, H. C. Nguyen, T. T. Pham, **D. H. Pham** and P. D. Nguyen, "Time-frequency analysis based Deep Learning for gear fault classification", Accepted in *SN Applied Sciences*, November 2023.
- [13] **D. H. Pham**, A. Basarab, I. Zemmoura, JP Remenieras, and D. Kouame, "Joint Blind Deconvolution and Robust Principal Component Analysis for Blood Flow Estimation in Medical Ultrasound Imaging," in *IEEE Trans. on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 68, no. 4, pp. 969-978, April 2021.
- [12] S. Meignen, **D. H. Pham**, and M. A. Colominas, "On the use of Short-Time Fourier Transform and Synchrosqueezing-Based Demodulation for Mode Reconstruction of Multicomponent Signals," *Accepted for publication in Signal Processing*, August 2020.
- [11] M. A. Colominas, S. Meignen, and **D. H. Pham**, "Fully Adaptive Ridge Detection Based on STFT Phase Information," in *IEEE Signal Processing Letters*, vol. 27, pp. 620-624, April 2020.
- [10] S. Meignen, **D. H. Pham**, and M. A. Colominas, "On the use of Short-Time Fourier Transform and Synchrosqueezing-Based Demodulation for Mode Reconstruction of Multicomponent Signals," *Accepted for publication in Signal Processing*, August 2020.
- [9] M. A. Colominas, S. Meignen, and **D. H. Pham**, "Fully Adaptive Ridge Detection Based on STFT Phase Information," in *IEEE Signal Processing Letters*, vol. 27, pp. 620-624, April 2020.
- [8] S. Meignen, T. Oberlin and **D. H. Pham**, "Synchrosqueezing Transforms: from low to high frequency modulations and perspectives, ", in *Comptes Rendus de l'Académie des Sciences (CRAS)*, special issue 250 J. Fourier birth, vol. 20, pp. 449-460, July–August 2019.
- [7] M. A. Colominas, S. Meignen, and **D. H. Pham**, "Time-Frequency Filtering Based on Model Fitting in the Time-Frequency Plane, " *IEEE Signal Processing Letters*, vol. 26, no. 5, pp. 660-664, May 2019.
- [6] S. Meignen and **D. H. Pham**, "Retrieval of the Modes of Multicomponent Signals from Downsampled Short-Time Fourier Transform," *IEEE Transactions on Signal Processing*, vol. 66, no. 23, pp. 6204-6215, December 2018.
- [5] **D. H. Pham**, and S. Meignen, "Second-order synchrosqueezing transform: The wavelet case, comparisons and applications, " *hal-01586372*, 2018.
- [4] **D. H. Pham**, S. Meignen, N. Dia, J. Fontecave-Jallon, and B. Rivet, "Phonocardiogram signal denoising based on non-negative matrix factorization and adaptive contour representation computation." *IEEE Signal Processing Letters*, vol. 25, pp. 1475-1479, October 2018.
- [3] **D. H. Pham** and S. Meignen, "An adaptive computation of contour representations for mode decomposition," *IEEE Signal Processing Letters*, vol. 24, pp. 1596-1600, November 2017.
- [2] **D. H. Pham** and S. Meignen, "High-order synchrosqueezing transform for multicomponent signals analysis - with an application to gravitational-wave signal," *IEEE Transactions on Signal Processing*, vol. 65, pp. 3168-3178, June 2017.
- [1] S. Meignen, **D. H. Pham**, and S. McLaughlin, "On demodulation, ridge detection and synchrosqueezing for multicomponent signals," *IEEE Trans. on Signal Processing*, vol. 65, no. 8, pp. 2093-2103, 2017.

International Conferences, Workshops, Thesis & Others

- [20] V. Pustovalov, D. H. Pham, D. Kouamé, “Super-resolution Ultrasound imaging via Unpaired Training with the Model-Informed CycleGAN Algorithm,” in *IEEE 21th International Symposium on Biomedical Imaging (ISBI)*, May 27- 30, 2024, Athens, Greece.
- [19] S. Dutta, N. K. Tuador, J. Michetti, B. Georgeot, D. H. Pham, D. Kouamé, and A. Basarab, “Computed Tomography Image Restoration Using a Quantum-Based Deep Unrolled Denoiser and a Plug-and-Play Framework”, in *EUSIPCO 2023*, September 04 -08, 2023, Helsinki, Finland.
- [18] V. Pustovalov, D. H. Pham, D. Kouamé, “Physics-Informed Cyclic GAN for Resolution Enhancement with Application to Ultrafast Ultrasound Blood Flow Imaging,” in *IEEE International Ultrasonics Symposium (IUS 2023)*, September 3 – 8, 2023, Montréal, Canada.
- [17] D. H. Pham, V. Pustovalov, D. Kouamé, “Blind Deconvolved Robust Principal Component Analysis (BD-RPCA) for Enhancing Ultrasound Localization Microscopy (UML) Performance,” in *IEEE International Ultrasonics Symposium (IUS 2023)*, September 3 – 8, 2023, Montréal, Canada.
- [16] D. H. Pham, V. Pustovalov, D. Kouamé, “The Performance Improvement of Ultrasound Localization Microscopy (UML) Using the Robust Principal Component Analysis (RPCA),” in *the 45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, July 24 – 27, 2023, Sydney, Australia.
- [15] V. Pustovalov, D. H. Pham, D. Kouamé, “Deep Unfolding RPCA for High-Resolution Flow Estimation,” in *IEEE International Ultrasonics Symposium (IUS 2022)*, October 10 – 13, 2022, Venice, Italy.
- [14] J. Michetti, D. H. Pham, A. Basarab, F. Diemer, D. Kouamé, “Validation of a new CBCT automated method to explore root canal transportation”, *20th Biennial Congress of the European Society of Endodontology (ESE 2022)*, European Society of Endodontology, Sep 2022, Budapest, Hungary.
- [13] J. Michetti, A. Basarab, D. H. Pham, D. Kouamé, F. Diemer, “Shaping ability of new RevoS and ProTaper Gold: a cone-beam computed tomography study”, *20th Biennial Congress of the European Society of Endodontology (ESE 2022)*, European Society of Endodontology, Sep 2022, Budapest, Hungary.
- [12] V. Pustovalov, D. H. Pham, JP. Remenieras, D. Kouamé, “Motion compensation for the estimation of high-resolution blood flow in ultrafast ultrasound imaging”, in *SPIE Medical Imaging (Ultrasonic Imaging and Tomography)*, 20 – 24 Feb. 2022, San Diego, California, United States.
- [11] N. K. Tuador, D. H. Pham, Varray François, A. Basarab, D. Kouamé, “Block-Wise 3D Ultrasound Image Super-Resolution,” in *IEEE International Ultrasonics Symposium (IUS 2021)*, Virtual Symposium, September 11 – 16, 2021.
- [10] D. H. Pham, A. Basarab, JP. Remenieras, P. Rodríguez, D. Kouamé, “Fast High Resolution Blood Flow Estimation and Clutter Rejection via an Alternating Optimization Problem”, *ISBI 2021*, Nice, France.
- [9] N. K. Tuador, D. H. Pham, J. Michetti, A. Basarab, D. Kouamé, “A Novel Fast 3D Single Image Super-Resolution Algorithm”, *ISBI 2021*, Nice, France.
- [8] D. H. Pham, A. Basarab, JP. Remenieras, D. Kouamé, “Blind deconvolution-based clutter suppression for vascularization imaging,” in *IEEE International Ultrasonics Symposium (IUS 2020)*, Las Vegas, USA, September 6 – 11, 2020.
- [7] S. Meignen, M. A. Colominas and D. H. Pham, “On the Use of Renyi Entropy for Optimal Window Length in the Short-Time Fourier Transform”, in *IEEE ICASSP, Barcelona, Spain*, May 2020.

- [6] D. H. Pham and S. Meignen, "Demodulation Algorithm Based on Higher Order Synchrosqueezing," in *EUSIPCO, A Coruña, Spain*, September 2019.
- [5] D. H. Pham and S. Meignen, "A novel thresholding technique for the denoising of multicomponent signals," in *IEEE ICASSP, Calgary, Alberta, Canada*, 2018.
- [4] D. H. Pham and S. Meignen, "Synchrosqueezing appliqué aux ondes gravitationnelles," in *Rencontre GdR ISIS-OG : questions ouvertes en analyse du signal pour l'astronomie gravitationnelle*, Paris, October 2018.
- [3] D. H. Pham, "Signal processing meets deep learning," in *IEEE-EURASIP Summer School, Capri, Italy*, September 2017. Poster.
- [2] D. H. Pham, "Analysis, synthesis and transformations by reassignment, emd and synchrosqueezing," in *Workshop ASTRES, Grenoble*, June 2016.
- [1] D. H. Pham, "Contributions to the Analysis of Multicomponent Signals Synchrosqueezing and Associated Methods," *PhD thesis, Université de Grenoble, dir: Dr. Sylvain Meignen*, September 2018.

Professional Experiences

- 09/19 – now **Asso. Prof. in Applied Maths & Computer Science** IRIT Laboratory, Toulouse, France
- ★ *Time-frequency analysis, reassignment, synchrosqueezing, approximation theory.*
 - ★ *Empirical mode decomposition, AM/FM decompositions, analytic signal.*
 - ★ *Inverse problems, machine learning, medical imaging (ultrasound, IRMf, etc.)*
- 10/18 – 09/19 **Postdoctoral researcher in Neuroimaging** ICube Laboratory, Strasbourg, France
- ★ *Project: Time, self and resting states in schizophrenia and bipolar disorder.*
 - ★ *Funding: postdoctoral contract of FRM (Fondation Recherche Médicale) Project*
 - ★ *Advisors: Anne Giersch (INSERM U1114, anne.giersch@inserm.fr), Sylvain Faisan (I-Cube, CNRS, fais@unistra.fr) and Céline Meillier (I-Cube, CNRS, meillier@unistra.fr).*
- 10/15 – 09/18 **Researcher in signal and image processing** LJK Laboratory, Grenoble, France
- ★ *Develop new parsimonious techniques for analysis of multi-component signals: Synchrosqueezing, Reassignment and EDM, etc.*
- 10/14 – 09/15 **Engineer for Electrical Products** Asiaphil Manufacturing Industries, Manila, Philippines
- ★ *Responsible for Technical Sales & Market penetration of company for Electrical Products: LV, MV, HV, transmission (Tyco Electronics, Simel, Bowthorpe like arresters, connectors, terminal kits, reactors, instrument transformers...).*
 - ★ *Contact new and existing customers to present products and manage relationship. Generate proposals to them based on technical requirements. Achieving pre-set sale goals.*
 - ★ *Ensure thorough familiarity with company's policies and procedures and appropriately apply them in compliance with government laws.*
- 02/14 – 08/14 **M.Sc internship** LJK Laboratory, Grenoble, France
- ★ *Get familiar with the SST and with related mode reconstruction techniques.*
 - ★ *Define an efficient sampling based on extrema of the highest frequency mode of a multi-component signal.*

- 02/13 – 06/14 **Engineer internship: projet fin d'étude** G-SCOP Laboratory, Grenoble, France
 * Create a prototype in formal language Maple to assess necessary clearance values according to parameters describing a set of CAD model.
- 06/12 – 09/12 **Engineer internship** DINAC company, La Mure, France
 * Develop a new threshold and stair nosing range through Product Life Management: Planning - Requirement definition - Benchmarking - Conceptual design - Embodiment design - Prototyping - Solutions optimization - Detail design - Documentation.
- 01/12 – 06/12 **Collaboration engineer project** Grenoble Institute of Technology, Grenoble, France
 * Find technical solutions for electric vehicle propulsion, Kart Biplace.
 * Carry out tests on different machines.
- 05/11 – 08/11 **Engineer internship** Danang University of Technology, Danang, Vietnam
 * Process design in mechanical fabrication.
 * Preliminary design, search and application of principal techniques.

Teaching Activities

- 09/19 – now **Applied Maths and Computer Science** Paul Sabatier University, Toulouse, France
- 09/17 – 09/18 **Applied Maths and Computer Science** ENSIMAG, Grenoble, France
 * Calculus for engineers (54 hTD) - Latex/SciLab (6 hTD)
- 09/15 – 09/17 **Applied Maths and Computer Science** Grenoble Alpes University, Grenoble, France
 * Linear Algebra (54.75 hTD) - Discrete maths (32 hTD) - Problem-based learning (32 hTD)

Education

- 10/15 – 09/18 **PhD in Applied Maths & Computer Science - Institut polytechnique de Grenoble**
Location: Jean Kuntzmann Laboratory, Grenoble, France
 ◊ **Topic:** Contributions to the analysis of multicomponent signals: synchrosqueezing and associated methods.
 ◊ **Funding:** Bourses d'Excellence de l'Ambassade de France au Vietnam
 ◊ **Advisors:** Dr. Sylvain Meignen (MdC, HdR). Email: sylvain.meignen@univ-grenoble-alpes.fr.
- 09/13 – 09/14 **International M.Sc. in Applied Maths & Computer Science, Grade: Excellent**
Location: Grenoble INP- Ensimag & Joseph Fourier University (UJF), Grenoble, France
 ◊ **Specialization:** Modeling & Scientific Computing - Geometry, Image and CAD & Data Science.
- 09/11 – 09/13 **Double Degree Engineer in Ind.Engineering & Mana. School, Grade: Good**
Location: Grenoble Institute of Technology, one of the most prestigious engineering "grandes écoles" (equivalent to a top-tier University), Grenoble, France
 ◊ **Specialization:** Product Industrial Engineering (IdP).
- 09/07 – 09/11 **Engineering Student, Grade: Excellent**
Location: French-Vietnamese Program of Excellence Engineer (PFIEV), Danang University of Technology, Vietnam
 ◊ **Specialization:** Automatic Production (PA).
- 09/04 – 09/07 **Scientific Baccaalaureate (equivalent to High School Diploma)**
Location: Hoang Dieu High School, Quangnam, Vietnam

Honours & Awards

2015	Scholarship , excellence-program of France Embassy for the Ph.D. at LJK	<i>Grenoble, France</i>
2011	Scholarship , 322-program of vietnamese and CNOUS of french governments for the double degree engineer at Grenoble Institute of Technology.	<i>Grenoble, France</i>
2010	Scholarship , petrol-Vietnam scholarship for an excellent academic result.	<i>Quangnam, Vietnam</i>
2009	Scholarship , Toyota scholarship for an excellent academic result.	<i>Quangnam, Vietnam</i>
2009	1 st Place , 12 th national students physics olympiad.	<i>Vinh, Vietnam</i>
2009	3 th Place , annual maths competition for best students of Danang University.	<i>Danang, Vietnam</i>
2008	1 st Place , annual maths competition for best students of Danang University.	<i>Danang, Vietnam</i>
2007	Runner-up , entrance examination of Danang University of Technology.	<i>Danang, Vietnam</i>
2006	3 th Place , annual maths competition for 12 th grade High School.	<i>Quangnam, Vietnam</i>
2004	3 th Place , annual mathematics competition for 10 th grade High School.	<i>Quangnam, Vietnam</i>

Extra-activities

- Vice-president of Grenoble Association of Vietnamese Students (**ÆVG**) (2016-2017).
- Member of the Research Commission of the Academic Council of Grenoble Alpes University (**UGA**) (2017-2018).
- Student Representative of Jean Kuntzmann Laboratory Council (**LJK**) (2016-2017 and 2017-2018).
- **ÆVG** football club.

Interests

- ◇ Sports: football, swimming, badminton...
- ◇ Music, travelling...