

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

### Supervision

#### • Postdoctoral Fellows

2024 - -. **Co-supervisors:**

#### • Ph.D. Students

- 2022 - now Arthur FLOQUET. **Co-supervisors:** D. Kouamé (IRIT/UPS) & E. Soubies (IRIT/ENSEEIH)
- 2021 - now Vassili PUSTOVALOV. **Co-supervisors:** D. Kouamé (IRIT/UPS)
- 2019 - 2023 Nwigbo Kenule TUADOR. **Co-supervisors:** D. Kouamé & A. Basarab (IRIT/UPS)
- 2019 - 2020 Thi-Hoang-Yen TRAN. **Co-supervisors:** Diener Francine, Laboratoire J.-A. Dieudonné, Université de Nice – Sophia Antipolis.

## • M2/Engineer Students

- 2024 Anes GHOULI. **Co-supervisors:** D. Kouamé (IRIT/UPS)
- 2024 Mohamed-Hamza EZZAKI.
- 2024 Hiba L'MOUDDEN.
- 2024 Mohamed-Amine KASMI.
- 2024 Ahmed KANDJI.
- 2023 Rick AGATE.
- 2023 Jessy KHAFIF. **Co-supervisor:** D. Kouamé (IRIT/UPS)
- 2023 Smati WISSEM. **Co-supervisors:** D. Kouamé (IRIT/UPS) & J. Michetti (dentist)
- 2022 Camille BILLOUARD. **Co-supervisors:** D. Kouamé (IRIT/UPS) & J. Michetti (dentist)
- 2023 Arthur FLOQUET. **Co-supervisors:** D. Kouamé (IRIT/UPS) & T. Oberlin (SUPÆRO)
- 2023 Guillaume VIVES. **Co-supervisor:** D. Kouamé (IRIT/UPS)
- 2023 Vassili PUSTOVALOV. **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, Ferrøelectrics, 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, ...

## Submitted papers

- [15] 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*.
- [14] M. A. Colominas, S. Meignen, and **D. H. Pham**, "Adaptive Ridge Detection and Mode Reconstruction Based on STFT Phase Information," *Preprint*.

## Published papers

- [13] 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.
- [12] 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.
- [11] **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, Apr. 2021.
- [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," in *Signal Processing*, Elsevier, Vol. 178, p. 107760, Jan. 2021.
- [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, Apr. 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, Aug. 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 Trans. on Signal Processing*, vol. 66, no. 23, pp. 6204-6215, Dec. 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, Nov. 2017.
- [2] **D. H. Pham** and S. Meignen, "High-order synchrosqueezing transform for multicomponent signals analysis - with an application to gravitational-wave signal," *IEEE Trans. on Signal Processing*, vol. 65, pp. 3168-3178, Jun. 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

- [18] V. Pustovalov, D. H. Pham, D. Kouamé, "Enhanced Localization in Ultrafast Ultrasound Imaging through Spatio-Temporal Deep Learning", in *European Signal Processing Conference (EUSIPCO) 2024*, August 26 - 30, Lyon, France. **Special Session**.
- [17] 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.
- [16] 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.
- [15] 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.
- [14] 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.
- [13] D. H. Pham, V. Pustovalov, D. Kouamé, "The Performance Improvement of Ultrasound Localization Microscopy (ULM) 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.
- [12] 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.
- [11] 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.
- [10] 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.
- [9] 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.
- [8] S. Dutta, N. K. Tuador, J. Michetti, B. Georgeot, D. H. Pham, A. Basarab, D. Kouamé, "Quantum denoising-based super-resolution algorithm applied to dental tomography images", in *IEEE International Symposium on Biomedical Imaging (ISBI) 2022*, March 28 -31, 2022, Kolkata, India.
- [7] 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.
- [6] 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", in *IEEE International Symposium on Biomedical Imaging (ISBI) 2021*, Nice, France.

- [5] N. K. Tuador, D. H. Pham, J. Michetti, A. Basarab, D. Kouamé, “A Novel Fast 3D Single Image Super-Resolution Algorithm”, in *IEEE International Symposium on Biomedical Imaging (ISBI) 2021*, Nice, France.
- [4] 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.
- [3] 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.
- [2] D. H. Pham and S. Meignen, “Demodulation Algorithm Based on Higher Order Synchrosqueezing,” in *EUSIPCO, A Coruña, Spain*, September 2019.
- [1] D. H. Pham and S. Meignen, “A novel thresholding technique for the denoising of multicomponent signals,” in *IEEE ICASSP, Calgary, Alberta, Canada*, 2018.

## Ph.D Thesis & Others

- [5] D. H. Pham, “Contributions to the Analysis of Multicomponent Signals: Synchrosqueezing and Associated Methods,” *Ph.D Thesis*, Laboratoire Jean Kuntzmann, Grenoble Alpes University, Grenoble, France, September 2018. Available: <https://theses.hal.science/tel-01881995>.
- [4] D. H. Pham, S. Meignen, “Second-order Synchrosqueezing Transform: The Wavelet Case, Comparisons and Applications,” *Diffusion Scientifique*. May 2018.
- [3] D. H. Pham, “Synchrosqueezing appliqué aux ondes gravitationnelles,” in *Rencontre GdR ISIS-OG : questions ouvertes en analyse du signal pour l’astronomie gravitationnelle*, Paris, October 2018.
- [2] D. H. Pham, D. H. Pham, “A family of synchrosqueezing transforms for multicomponent signal analysis,” in *EURASIP Summer School, Signal Processing meets Deep Learning – Capri*, Italy, September 2017. Poster.
- [1] D. H. Pham, “Analysis, synthesis and transformations by reassignment, emd and synchrosqueezing,” in *Workshop ASTRES*, Grenoble, June 2016.

## 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](mailto:anne.giersch@inserm.fr)), Sylvain Faisan (I-Cube, CNRS, [faisan@unistra.fr](mailto:faisan@unistra.fr)) and Céline Meillier (I-Cube, CNRS, [meillier@unistra.fr](mailto: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 Baccalaureate (equivalent to High School Diploma)**  
**Location:** Hoang Dieu High School, Quangnam, Vietnam

## Honours & Awards

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

## 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...