PIERRE-ANTOINE COMBY

PhD Student: functional MR Image reconstruction using Compressed Sensing and Deep Learning

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EXPERIENCE

PhD Student

Neurospin (CEA)

October 2021 – April 2025 CEA Saclay, France

fMRI reconstruction at ultra high field: From Compress Sensing to Deep learning-based method

- Supervisors: Philippe Ciuciu and Alexandre Vignaud

Research Intern

Neurospin (CEA)

April 2021 – August 2021 CEA Saclay, France

From Offline to Online pMRI reconstruction

- Development and Validation of new paradigm of image reconstruction
- Open-source contribution to pysap-mri package

Research Intern - Pre PhD Program

Institut for Process Data and Electronics (KIT)

October 2019 – July 2020 Karlsruhe, Germany

Analysis and optimisation of ray-based ultrasound 3D tomography

- Image reconstruction for Breast Cancer detection
- Developed new framework for transmission reconstruction
- MATLAB simulations and code optimisation.

EDUCATION

Master's Degree ATSI

Université Paris-Saclay - CentraleSupélec

2020 – 2021 (*summa cum laude*) Gif-sur-Yvette, France

Signal/Image Processing | Sparse Coding | Deep Learning

Normalien Élève

ENS Paris Saclay - Dpt of Electrical Engineering

2017 – 2021 Cachan, France

Signal/Image Processing | Control Processing | Power Electronics

PCSI-PSI*

Lycée Saint Louis

2015 – 2017 Paris IV, France

ABIBAC

Lycée Charles Péguy

2012 – 2015 (*summa cum laude*) Orléans, France

SKILLS

Python | Git | MATLAB | LaTeX | Linux | C/C++ | CUDA

English ●●●●●
French ●●●●●
German ●●●●○

PROJECTS & EXTRAS

MRI-NUFFT

Computation library for Non Cartesian MRI

Snake-fMRI

Simulator of functional MRI data

Student Union

Treasurer and IT Project manager

2018 ENS Paris-Saclay

250k€ Annual Budget, Development of Django ERP "NoteKfet"

Scoutism

Scouts et Guides de France

2015-Present

Responsible for 25 young teenager, Diploma of youth worker (BAFA).

REFEREES

Pr. Alexandre Vignaud
Head of METRIC Team (Neurospin, CEA)
alexandre.vignaud@cea.fr

Pr. Philippe Ciuciu
Head of MIND Team (Inria/CEA)
philippe.ciuciu@cea.fr

PUBLICATIONS

Conference Proceedings

- **Comby**, **P.-A.**, Guillaume Daval-Frerot, Chaithya Gr, A. Vignaud, and P. Ciuciu (2024). "MRI-NUFFT: An Open Source Python Package to Make Non-Cartesian MR Imaging Easier". In: *ISMRM Annual Meeting, (in Press)*. Singapore.
- **Comby**, **P.-A.**, A. Vignaud, and P. Ciuciu (2024). "SNAKE-fMRI: A Modular fMRI Simulator from the Space-Time Domain to k-Space Data and Back". In: *ISMRM Annual Meeting, (in Press)*. Singapore.
- Z. Amor, **P.-A. Comby**, P. Ciuciu, and A. Vignaud (May 2024). "Achieving High Temporal Resolution Using a Sliding-Window Approach for SPARKLING fMRI Data: A Simulation Study". In: *ISMRM Annual Meeting*. Singapore.
- Amor, Zaineb, **Pierre-Antoine Comby**, Caroline Le Ster, Alexandre Vignaud, and Philippe Ciuciu (Dec. 2023). "Non-Cartesian Non-Fourier FMRI Imaging for High-Resolution Retinotopic Mapping at 7 Tesla". In: *2023 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*. 2023 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP). (visited on 03/05/2024).
- **Comby**, **Pierre-Antoine**, Zaineb Amor, Alexandre Vignaud, and Philippe Ciuciu (June 2023a). "Benchmarking Local Low Rank Denoising Methods for Task-Based fMRI Data Analysis". In: *ISMRM 2023 Annual Meeting*. Toronto.
- – (Apr. 18, 2023b). "Denoising of FMRI Volumes Using Local Low Rank Methods". In: ISBI 2023 - International Symposium on Biomedical Imaging. (Visited on 03/27/2023).
- Hopp, T., F. Zuch, **P.-A. Comby**, and N. V. Ruiter (Mar. 16, 2020). "Fat Ray Ultrasound Transmission Tomography: Preliminary Experimental Results with Simulated Data". In: *Medical Imaging 2020: Ultrasonic Imaging and Tomography*. Medical Imaging 2020: Ultrasonic Imaging and Tomography. International Society for Optics and Photonics. (Visited on 05/28/2021).

AWARDS & GRANTS

Educational Stipend ISMRM

Stipend from the Internation MRI Scientific community

2024

2nd Best Abstract Award - Reproducibility Group

ISMRM 2024

SNAKE-fMRI: A modular fMRI data simulator from the space-time domain to k-space and back

CDSN PhD Grant

Doctoral grant for Ecole Normale Supérieure top students

2021-2025