

# 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

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### Conference Proceedings

- Amor, Z., **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.
- **Comby, Pierre-Antoine**, Guillaume Daval-Frerot, Chaithya Gr, Alexandre Vignaud, and Philippe Ciuciu (May 2024). "MRI-NUFFT: An open source Python package to make non-Cartesian MR Imaging easier". In: *ISMRM annual meeting*. Singapore.
- **Comby, Pierre-Antoine**, Alexandre Vignaud, and Philippe Ciuciu (May 2024). "SNAKE-fMRI: A modular fMRI simulator from the space-time domain to k-space data and back". 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)*.
- **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. 2023b). "Denoising of fMRI Volumes Using Local Low Rank Methods". In: *2023 IEEE 20th International Symposium on Biomedical Imaging (ISBI)*.
- Hopp, T., F. Zuch, **P.-A. Comby**, and N. V. Ruiters (2020). "Fat ray ultrasound transmission tomography: preliminary experimental results with simulated data". In: *Medical Imaging 2020: Ultrasonic Imaging and Tomography*. SPIE.

## AWARDS & GRANTS

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Educational Stipend ISMRM

**Stipend from the International 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