

Curriculum Vitae

Zakaria ZARIRY

Ph.D. in Medical Imaging / Neuroimaging Researcher

Specialist in advanced MRI methodologies with expertise in motion correction, pediatric neuroimaging, and image reconstruction and processing. Proven ability to design innovative solutions for complex imaging challenges, demonstrated through peer-reviewed publications and technical implementations. Seeking postdoctoral position to advance research in MRI motion correction and neuroimaging.

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Language skills: Arabic (native speaker), French (fluent), English (Solid working level).

EDUCATION

** Ph.D. in Medical Imaging Methodology

Nov 2021 – Expected Dec 2025

Claude Bernard Lyon 1 University, Lyon, France

Thesis Title: Longitudinal MRI study of infant brain development: acquisition and post-processing methodologies.

Supervisors: Dr. Bassem Hiba, Dr. James Bonaiuto.

** M.Sc. in Medical Imaging Signal & System

2020 – 2021

Polytech Lyon - Claude Bernard Lyon 1 University, Lyon, France

Minors: Advanced image processing - Inverse problems - Image registration - MRI physics - Introduction to supervised, unsupervised, and deep learning alg.

** Biomedical Engineering Degree

2017 – 2020

Graduate School of Biomedical Engineering, Casablanca, Morocco

Minors: Medical image processing - Signal acquisition and processing - C/C++ programming - Digital & analogue electronics - Human anatomy.

** Preparatory Classes for Engineering Schools (CPGE – PSI)

2015 – 2017

CPGE Ibnou Taymia, Marrakech, Morocco

RESEARCH EXPERIENCE

** Doctoral Researcher | ISC MJ - CNRS UMR5229

Nov 2021 – Present

Head Motion Correction in MRI & Pediatric Neuroimaging

Standardized Head Motion Correction Evaluation in MRI

- Designed a standardized evaluation pipeline for MRI head motion correction strategies.
- Implemented real-time feedback system for monitoring and controlling subject head motion during MRI acquisition.
- Implemented an anatomical image reconstruction pipeline with head motion correction: MP-RAGE and T2-SPACE sequences.
- Conducted an experimental study comparing two head motion estimation and correction approaches.

Infant brain MRI Acquisition and Longitudinal Data Processing

- Built custom MRI phantom and optimized protocols for 3T structural brain imaging (3 - 12 months infants).
- Conducted 60+ pediatric MRI acquisitions with prospective motion correction.
- Developed comprehensive processing pipeline for infants anatomical/diffusion data (segmentation and surface reconstruction, template creation, cortical parcellation, morphometric quantification, DTI maps and TBSS analysis).

Investigating the Impact of Motion on Quantitative MRI and Morphometry in Infants

- Reversed prospective head motion correction on anatomical T1-weighted and T2-weighted MRI of infants.
- Performed analyses to assess the influence of head motion on morphometric measures and demonstrated its impact on image quality and quantitative reliability.

Non-Human Primate Imaging

- Developed a processing pipeline for high-resolution anatomical/diffusion MRI.
- Implemented ROI-based surface tractography using FSL tools.

**** Research Internship | ISC MJ - CNRS UMR5229**

Mar – Aug 2021

- Implemented real-time MRI head-motion correction using markerless optical system on Siemens 3T Prisma.
- Designed motion protocols and acquired T1- and T2-weighted images with prospective motion correction.
- Evaluated the system's performance under different motion scenarios.

PUBLICATIONS & CONFERENCES

**** Peer-Reviewed Articles**

- **Zariry Z.** et al. Examining the effects of prospective head motion correction on anatomical MRI scans in newborn infants. (In preparation)
- **Zariry, Z.**, Lamberton, F., Frost, R., Gaass, T., Troalen, T., Rayson, H., Slipsager, J.M., Richard, N., van der Kouwe, A., Bonaiuto, J., Hiba, B., An in-vivo approach to quantify in-MRI head motion tracking accuracy: comparison of markerless optical tracking versus fat-navigators. (under review). Preprint: medRxiv <https://doi.org/10.1101/2025.04.23.25326185>
- Bihan-Poudec, Y., Tounekti, S., Troalen, T., Rayson, H., Froesel, M., Lamberton, F., **Zariry, Z.**, Gacoin, M., Richard, N., Ben Hamed, S., Hiba, B., 2023. Cardiovascular effects on high-resolution 3D multi-shot diffusion MRI of the rhesus macaque brain. Imaging Neuroscience. https://doi.org/10.1162/imag_a_00039

**** Conference Proceedings**

- **Zariry, Z.**, Lamberton, F., Frost, R., Gaass, T., Troalen, T., Rayson, H., Slipsager, J.M., Richard, N., A., Bonaiuto, van der Kouwe, J., Hiba, B., An in-vivo approach to quantify head motion tracking accuracy: comparison of markerless optical tracking versus fat-navigators. Presented at the Annual Meeting ISMRM 2025, Honolulu, Hawai, USA
- **Zariry, Z.**, Frost, R., Lamberton, F., Troalen, T., Richard, N., Van Der Kouwe, A., Hiba, B., Evaluation of markerless prospective motion correction for neuroanatomical MRI. Presented at the Annual Meeting ISMRM 2022, London, England, UK. <https://doi.org/10.58530/2022/1951>

TECHNICAL SKILLS

- **Programming:** Python (Numpy, Scipy, Cupy, Pytorch), Bash, C/C++, Matlab.
- **Neuroimaging tools:** FreeSurfer, FSL, ANTs, MRtrix3, SPM.
- **Data Processing:** Pipeline development (BIDS), Parallel computing, Statistical analysis using R.
- **MRI Acquisition & Analysis:** Prospective/retrospective motion correction, Image reconstruction, ISMRMRD & Gadgetron tools.
- **MRI Pulse Sequence Development:** Siemens Healthineers IDEA sequence programming training (2022).

PROFESSIONAL EXPERIENCE

**** Biomedical Engineering intern**

Feb – July 2020

AfriGaz Sarl, Casablanca, Morocco

- Conducted market analysis for medical devices in Morocco, defined product portfolio and selected suppliers.
- Managed regulatory submissions for device registrations.
- Developed tracking software for device inventory management.