



Job Description

Job Title:	Research Fellow in MR Physics (Motion-Robust fMRI Acquisition for Infant Brain Imaging)
Post Status:	Specific Purpose Contract, Full-Time for 2 years
Research Group/ School/Department:	Cusack Lab, Trinity College Institute of Neuroscience, Trinity College Dublin, the University of Dublin
Location:	Trinity College Institute of Neuroscience, Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland
Job Category and Level:	Appointment will be on the Research Ireland Post Doctoral Researcher Salary Scale (Level 2 [€47,273 – €58,378]); appointment will be made no higher than level 2A point 3 [€58,578]
Hours of Work:	39 hours per week

The Purpose of the Role

Infants move. Head motion is the single biggest obstacle to functional MRI in the first years of life: it corrupts the BOLD signal, discards large fractions of hard-won data, and biases what survives. The FreezeMotion project tackles this end to end – from the pulse sequence, through image reconstruction, to deep-learning-based signal recovery – so that the functional signal we care about can be measured reliably in awake infants.

The existing FreezeMotion team works on the reconstruction and deep-learning side of the pipeline. This post adds the acquisition. The postholder will rethink how the data are collected so that, given a standard reconstruction pipeline and the deep-learning components downstream, the measurement is far more robust to motion than a conventional EPI acquisition. Silent, motion-tolerant sequences such as zero-echo-time or non-Cartesian approaches are one promising basis, but the project is not committed to a particular family of sequences: the postholder will help decide.

With Professor Cusack and the team, the postholder will take ownership of the acquisition side of the project: surveying candidate strategies, designing and implementing modified sequences on the scanner, validating them in phantoms and adults, co-designing acquisition and reconstruction with

the team, defining the metrics that show whether a new acquisition preserves the important parts of the fMRI signal under realistic infant motion, and writing up the results.

Context

The team is based in the Trinity College Institute of Neuroscience (TCIN), which brings together 60 groups and 250 scientists from a broad range of disciplines, to study the brain from molecules to mind to society. It houses state of the art equipment, including a Siemens 3T Prisma MRI scanner, a CERCA OPM-MEG system, and an NVIDIA GPU cluster. TCIN aims also to span levels from fundamental research to translation (bench-to-bedside). The postholder will report to Professor Rhodri Cusack and work closely with the existing FreezeMotion team on reconstruction and deep learning, as part of a diverse group using brain imaging and NeuroAI to understand the infant brain.

Funding Information

This post is funded by Research Ireland Frontiers for the Future “FreezeMotion” grant SFI-22/FFP-A/11050.

Main Responsibilities

- Survey candidate acquisition strategies for motion-robust infant fMRI (e.g. ZTE/silent methods, non-Cartesian and self-navigated trajectories, multi-echo and low-rank approaches, prospective motion correction) and assess their suitability for infant BOLD
 - Design and implement modified pulse sequences on the Siemens 3T Prisma, and validate them in phantoms and adults before infant use
 - Work closely with the reconstruction and deep-learning members of the team to co-design acquisition and reconstruction, so that the data acquired are what the downstream pipeline needs to recover the signal most reliably
 - Define quantitatively which properties of the fMRI signal matter for the project's questions, and build the metrics and test protocols that show whether a new acquisition preserves them under realistic infant motion
 - Support acquisition during infant scanning sessions and help the wider team run and troubleshoot protocols
 - Be collaborative and constructive, working with the team and Professor Cusack to conduct insightful, original research
-

-
- Apply robust and reproducible methods to produce the highest quality science, and maintain the highest ethical standards
 - Present work at local, national and international meetings (e.g. ISMRM, OHBM) and write clear, authoritative and impactful manuscripts
 - Contribute to the open release of sequences, protocols and analysis code
 - Provide constructive feedback to other team members and Professor Cusack, to strengthen others' work
 - Supervise undergraduate research students as a co-supervisor, and seek opportunities for teaching and mentoring
 - Contribute to the administrative and practical excellence of the lab
-

Person Specification

This section sets out the knowledge, skills and attributes the post-holder will need for successful performance in the role.

Qualifications

- A PhD (or near completion) in MR physics, biomedical engineering, physics or a closely related field is essential

Knowledge and Expertise

- Hands-on experience developing or modifying pulse sequences on a clinical or research MR system (e.g. Siemens IDEA, GE EPIC, Philips, or Pulseseq) is essential
 - A strong understanding of MR signal formation, k-space sampling, and the physics of BOLD contrast and EPI artefacts is essential
 - Programming skills in at least one of C++ or Python, and comfort working with image reconstruction code, are essential
 - Experience with non-Cartesian, zero-echo-time or silent sequences (e.g. Looping Star, ZTE, spiral, radial), or with prospective/retrospective motion correction, is highly desirable
 - Experience with advanced reconstruction (parallel imaging, compressed sensing, low-rank or model-based methods, or learned reconstruction) is highly desirable
 - Familiarity with fMRI analysis and quality metrics (tSNR, motion-related variance, framewise displacement) and with how acquisition choices affect them is desirable
-

-
- Experience with paediatric, neonatal or otherwise motion-prone populations is desirable
 - An interest in cognitive and developmental neuroscience and in the questions the data will be used to answer is desirable

Skills

- strong critical thinking and good judgement
- excellent organisation and time management
- the ability to plan and run experiments independently, from phantom tests to in-vivo validation
- the ability to find, read, critique and synthesize complex bodies of literature
- the ability to work thoroughly through tasks until they are completed, even if they turn out to be more difficult than you first expect
- the ability to write clearly and concisely
- enthusiasm and aptitude to collaborate closely with colleagues from reconstruction, machine learning and neuroscience backgrounds
- enthusiasm and aptitude to share expertise with other team members
- enthusiasm for communication with a broader audience
- a desire to develop your transversal and cross-sectoral skills

Personal Attributes

- The ability to generate new ideas and build on existing to generate unique concepts and solutions with integrity
 - The ability to contribute to broader organisational and management processes
 - The ability to manage self, time, resources and people
 - The capacity to work independently on research projects as well as part of a team
-

How to Apply:

Applicants should send to admin@cusacklab.org:

- A Curriculum Vitae
- A Cover Letter (maximum one A4 page) outlining qualifications and experience relevant to the job specification
- Details of two referees (including email addresses)

Closing Date: 15 November, 2026 at 12:00 noon (Irish Standard time)

Trinity Competencies

In Trinity there are 6 Core Competencies that are applicable to all roles across a range of professional, administrative and support jobs, unlike specialist or technical skills which may be job specific. They provide a common language for describing performance and the abilities/attributes displayed by individuals. They focus on 'how' tasks are achieved, not 'what' is achieved.

Below is a summary definition of the 6 Core Competencies.

	Competency	Summary Definition
1	Agile Leader	Sees the big picture and harnesses opportunities to achieve the University's goals. Creates clear direction for the future and how to get there.
2	Unlocks Potential	Energised, capable and confident to take ownership and responsibility for their development and goals. Motivates, supports and develops people to perform to the best of their ability.
3	Service Ethos	Finds ways to increase stakeholder and customer satisfaction. Builds relationships, is proactive and delivery focused in order to anticipate, meet & exceed expectations.
4	Builds Trusted Relationships	Communicates in a clear and respectful manner building trust and commitment for mutually beneficial outcomes.
5	Decision-making	Confidently makes timely decisions based on knowledge, evidence and sound judgement.
6	Achieves Results	Delivers results by setting direction, planning, executing and evaluating impact.