Postdoctoral Research Fellowship in AI for Low-Cost PET–MRI Imaging

University of Cape Town, South Africa

Purpose

The Shocklab, picoPET, and SoLow research groups at the University of Cape Town (UCT) invite suitably qualified candidates to apply for a **Postdoctoral Research Fellowship** in AI for low-cost medical imaging. The fellowship advances research at the intersection of artificial intelligence, image reconstruction, and multimodal neuroimaging, with applications to global health and diagnostic equity in low-resource settings.

Call for Applications

The successful fellow will be jointly hosted by the Department of Mathematics and Applied Mathematics, the picoPET group in the Department of Physics, and the SoLow group in the Department of Biomedical Engineering, and will conduct research on AI-based PET/MRI reconstruction, PET–MRI fusion, and advanced image analysis techniques.

Conditions of Award (General)

- Applicants must have achieved a doctoral degree within the past **five (5)** years.
- Applicants may not previously have held full-time, permanent professional or comprehensive academic posts.
- The successful incumbent will be required to comply with UCT's approved policies, procedures, and practices for postdoctoral fellows.
- No benefits or allowances are included other than those stated under *Value and Tenure*.
- Postdoctoral fellows may undertake up to **12 hours per week** of remunerated employment outside the fellowship for professional development; such remuneration is taxable and processed via UCT HR.

Value and Tenure

- **Value of the fellowship: R500,000 per annum**, compliant with the SARS Binding Class Ruling and therefore tax-exempt.
- **Travel allowance: R50,000 per annum** for conferences and collaborations.

- **Tenure:** One (1) year, renewable for up to two (2) additional years (maximum three years). In line with UCT policy, further extension up to five years of enrolment may be considered under exceptional circumstances.
- **Location:** University of Cape Town, South Africa.
- **Start date:** Available immediately or from early 2026.

Academic Criteria

- PhD in a relevant field (e.g., AI, biomedical engineering, medical imaging, applied mathematics, physics).
- Experience with image reconstruction/medical imaging or a strong computer vision background, and deep learning.
- Proficiency in Python-based ML frameworks (e.g., JAX, PyTorch).
- Strong publication record and ability to work independently.

Project Description

The fellow will lead research at the interface of AI and low-cost imaging hardware, including:

- Design of AI-based PET and MRI reconstruction algorithms optimized for signal recovery, clinical interpretability, and efficiency.
- Validation on simulated and experimental data, benchmarking against MLEM, OSEM, and FBP using PSNR/SSIM or related metrics.
- Development of PET–MRI image fusion pipelines combining picoPET and SoLow data.
- Evaluation of the diagnostic utility of fused images through expert review or pilot clinical studies.
- Exploration of advanced techniques (e.g., end-to-end multimodal models, latent-space regularization, attention mechanisms, diffusion-based denoising, super-resolution).

The long-term aim is to demonstrate that AI can enable high-quality medical imaging in low-resource settings using affordable hardware.

Research Environment

- **Shocklab**, led by Associate Professor Jonathan Shock (Department of Mathematics and Applied Mathematics; Interim Director of the UCT AI Initiative).
- **picoPET**, led by Dr James Keaveney, developing novel low-cost PET systems.
- **SoLow**, led by Professor Ernesta Meintjes, pioneering low-field MRI technology.

The fellow will join an interdisciplinary team across Biomedical Engineering, Mathematics and Applied Mathematics, Physics, and the Neuroscience Institute.

Computing Resources

- Access to the UCT High Performance Computing cluster.

Application Requirements

Please submit a single PDF including:

- Letter of application stating expertise, research interests, and experience.
- Curriculum vitae with publication list.
- Description of prior research and its relevance to AI-based medical imaging.
- Research statement (1–2 pages) outlining ideas for the PET–MRI project.
- **Certified copies of academic transcripts.**
- **Either** names and contact details **or** letters of reference from at least two academics who have taught, supervised, or worked with the applicant.

Applications and enquiries: Associate Professor Jonathan Shock, jonathan.shock@uct.ac.za

Selection Process

Eligible and complete applications will be considered by the hosting departments in consultation with the relevant research groups. Shortlisted candidates may be invited for interview.

Key Dates

Application deadline: 15 September 2025
Interviews: October 2025

About UCT and Cape Town

UCT, founded in 1829, is consistently ranked among Africa's leading universities, with a diverse community of over 30,000 students and a strong international profile. The main campus lies at the foot of Table Mountain in Cape Town, a city offering a unique blend of natural beauty and urban culture. Living costs in Cape Town are substantially lower than in major US or European cities. See: `https://www.numbeo.com/cost-of-living/in/Cape-Town`

Equity Statement

UCT is committed to the pursuit of excellence, diversity and redress in achieving its equity targets in accordance with the Employment Equity Plan of the University and its Employment Equity goals and targets. The Employment Equity Policy is available at Employment Equity Policy.

Indemnity

The University of Cape Town reserves the right to disqualify ineligible, incomplete and/or inappropriate applications, change the conditions of award, or make no awards at all.