

PhD in the Production & Analysis of Nuclear Threat Reduction Relevant Radionuclides

The UK's Nuclear Threat Reduction (NTR) programme requires regular access to samples of relevant radionuclides to demonstrate its capability in nuclear forensics (NF) investigations. This capability is essential for the protection of the UK and its international allies. Demonstration of competence in NF acts as a deterrent to malicious actors and ensures the UK's commitment to upholding international treaties such as the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

The PhD project will use the University of Birmingham accelerator facilities (cyclotron and neutron irradiation facility) to research appropriate nuclear reaction pathways to access the desired radionuclides and fabricate appropriate targets to facilitate isotope production. It will involve post-irradiation dissolution methods, subsequent radiochemical purification, and appropriate measurements to harvest desired nuclear data linked to the development of new nuclear forensics techniques.

The successful applicant for this project will join the first cohort of the AWE funded NTR-net CDT (October 2024) and will involve a research programme associated with:

- Target design and processing for irradiations.
- Production of specific radionuclides using particle accelerators.
- Nuclear data acquisition (cross section measurements, emission probabilities, etc).
- Post-irradiation processing i.e., target dissolution, radiochemical purification, and analysis.
- Nuclear forensics processes and analytical techniques (e.g., High Resolution Gamma Spectrometry, alpha spectrometry, etc).

The successful applicant will undertake this project at the University of Birmingham but will have the opportunity to work with other UK and US irradiation facilities during the project. Due to the nature of this project UK citizenship is preferred but not essential.

For further information please contact Professor Martin Freer at the University of Birmingham.

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