



**Delft University of Technology**

### **Department Radiation, Radionuclides & Reactors**

Radiation ties the *Radiation, Radionuclides & Reactors* department together. However various our interests, whether they be materials, sensors and instrumentation, energy and durable production or health, all our research is somehow related to radiation. The close collaboration with the *Reactor Institute Delft* (RID) not only guarantees access to the reactor and the irradiation facilities, but also results in three centres of knowledge: the Positron Centre, the Neutron Centre and the Luminescence Centre. The confluence of all this knowledge makes our research unique in the Netherlands.

[Section Radiation Detection & Medical Imaging \(RD&M\)](#) directs its research and education into the detection and use of radiation (including light quanta, X-rays and gamma radiation, neutrons, electrons and positrons, protons, and light ions) and into luminescence materials (gamma ray scintillators, neutron scintillators, storage phosphors, luminescence phosphors, see also our website [www.rrr.tudelft.nl](http://www.rrr.tudelft.nl) for more information.

### **Current Job Openings of this section:**

#### **PhD Students and Post Docs (Physicists) for Molecular Imaging Physics Research**

Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET) enable in-vivo imaging of molecular tissue functions using radio-labeled tracer molecules. SPECT and PET are used in a wide range of pre-clinical and clinical applications, such as cancer detection, brain mapping, and biomedical research. Our group performs research on novel SPECT and PET devices that will redefine the state-of-the-art in molecular imaging.

#### **Project I. High resolution detectors for radio-molecular imaging**

In currently available SPECT systems, the gamma-rays emitted by the radiotracers are detected by scintillation detectors with intrinsic spatial resolutions of a few mm. The image quality of SPECT systems can be dramatically improved if high-resolution detectors become available. Such detectors are under development in our group. For this project we are looking for a highly motivated PhD student (4 years) or Post Doc (max. 2 years) with a degree in (applied) physics or a related area.

The candidate will work on the improvement of scintillation-based detectors, focusing especially on optical issues related to the use of scintillation crystals in combination with solid-state, position-sensitive light sensors (e.g. Electron Multiplying CCD's and Silicon photomultipliers (SiPMs)). This will result in models that predict optimal combinations of

scintillation crystals, coupling, and image sensors. In a later stage the candidate will participate in the integration of the newly developed high-resolution detector into a prototype ultra-high-resolution SPECT system.

Further project information:

[www.senternovem.nl/iop\\_photonicdevices/projecten/ipd067766.asp](http://www.senternovem.nl/iop_photonicdevices/projecten/ipd067766.asp)

## **Project II. Combined Small animal SPECT and PET**

Applications of PET and SPECT partly overlap and are often complementary. A system that combines the two modalities will therefore have a wide range of application. Currently, there is no such scanner available. In a joint project with other academic institutions and industry (e.g. MILabs), our group will develop a hybrid PET/ SPECT scanner with unsurpassed spatial resolution. We are looking for highly motivated PhD students (4 years) and Post Docs (max. 2 years) with a degree in (applied) physics or a related area.

The candidates will participate in experimental research and computational physics leading to an exciting new PET/SPECT scanner. Topics include research on new high-resolution detectors for the hybrid system, testing of different collimator designs, computer simulations to predict and optimize the system's performance, the development of read-out electronics, the system calibration procedure and the development of image reconstruction software.

## **Conditions of employment**

These are fulltime (1.0 FTE) positions. PhD positions are offered for a period of four years. Postdoctoral positions are offered for a period of 2 years. The monthly salary for a PhD will be to a maximum of € 2558 gross. The monthly salary for a postdoctoral researcher (scale 10) will be to a maximum of € 3678 gross, depending on the level of experience.

Delft University of Technology strives to increase the number of women in higher academic positions; thus women are especially encouraged to apply.

## **Information and application**

Please send your resume with the addresses of three references to Mrs. Thea Miedema, E-mail: [t.miedema@tudelft.nl](mailto:t.miedema@tudelft.nl). For more information please contact Prof. dr. Freek Beekman, E-mail: [f.j.beekman@tudelft.nl](mailto:f.j.beekman@tudelft.nl)