

PhD POSITION DC6 · MATHEMATICS / RADIOLOGY

Joint Denoising and Material Decomposition in Photon Counting Computed Tomography

Model-based and learned methods for spectrally resolved CT

Supervisors: Lukas Neumann, University of Innsbruck | Stephanie Mangesius, Medical University of Innsbruck

The project

Photon-counting detectors enable spectrally resolved CT, one of the main imaging modalities for many clinical indications. While early reconstruction methods focused on K-edge-based substance identification, newer methods open up much broader applications. In this project you will combine material decomposition and noise reduction, leveraging both mathematical modelling and machine learning, and develop efficient, problem-adapted learning strategies for diffusion models on spectral CT data. Applications include multispectral CT and automated stroke prediction from photon-counting CT (PCCT).

Your profile

We are looking for student with a masters degree and a strong mathematical background as well as coding skills in Python. You should be interested in

- inverse problems
- mathematical modelling
- machine learning and optimization
- development, implementation and evaluation of algorithms

but direct experience in the field is not necessary. Ideally you have

- a Master's degree in mathematics with coding experience in Python;
- a degree in physics or engineering with documented mathematical interest (masters topic, elective subjects, ...) and coding experience;
- a degree in computer science with also a strong mathematical focus.

Purely application-oriented profiles without solid, documented mathematical training are not an ideal fit.

Formal eligibility (as in the official call):

- Master's (or equivalent) degree, final certificate available before employment starts; no doctoral degree yet.
- MSCA mobility rule: not more than 12 months of living, working or studying in Austria in the 36 months before 10 December 2026.

What we offer

- Full-time doctoral employment contract for 3 years (40 h/week).
- Salary from €3,776.10 gross per month (level B1, Austrian universities' collective agreement) plus allowances – about a third above most PhD contracts in Austria.
- Enrolment in the doctoral programme in Engineering Sciences at the University of Innsbruck, with structured training across both universities (winter schools, transferable-skills courses).
- Two secondments at international academic and non-academic partner institutions.
- A truly interdisciplinary environment between mathematics and clinical radiology – and life in the Alps.

How to apply

- Apply online: ignidte.i-med.ac.at/apply – deadline **10 December 2026**.
- Select **DC6** as your preferred doctoral project and include a 2-page research proposal for it.
- Online interviews with shortlisted candidates: 18–31 January 2027; decisions by the end of February 2027.

Questions about the project? Informal enquiries are welcome: **Lukas Neumann**, lukas.neumann@uibk.ac.at
General questions about the programme and the application: phd-ignidte@i-med.ac.at