Doctoral candidate 1: Model-based region of interest 4DCT of smart materials

Host Institution	University of Antwerp, Belgium
PhD enrolment	University of Antwerp, Belgium
Primary Supervisor	Prof. dr. Jan Sijbers
Subject area	Computational imaging, dynamic CT, inverse problems, smart materials

About this doctoral project and your tasks

You will develop an efficient 4DCT reconstruction scheme for studying dynamic materials that combines iterative image reconstruction and motion estimation in a single update step, based on the analytical gradients of the motion towards both the reconstruction and the affine motion parameters. Next, the 4DCT reconstruction scheme will be unrolled so as to combine the benefits from physics-based modelling and advanced data driven priors using dynamic recurrent inference machines. The focus of the PhD will be on lowering the dose and the required number of projections for 4D data reconstruction. These advancements will facilitate the imaging and characterisation of hydrogels. Specifically, in situ tensile tests will be performed on hydrogels to demonstrate the methodology as well as to facilitate characterisation studies in WP3.

Your tasks will include :

- The development of a dedicated and efficient 4DCT method for smart materials
- Validate the 4DCT method on real dynamic scans of smart materials (e.g. hydrogels)
- Create a demonstrator software smart materials 4DCT

Foreseen secondments

For this project, we foresee secondments to:

- **Dr. Lucia Mancini** (2 months) at Slovenian National Building and Civil Engineering Institute (Slovenia)
- **Denis Van Loo** (1 month) at Tescan XRE (Belgium)

About the host institution and research group

The University of Antwerp is a dynamic, forward-thinking university in the second largest city in Belgium. We offer an innovative academic education to more than 20000 students, conduct pioneering scientific research and play an important service-providing role in society. With more than 6000 employees from 100 different countries, we are helping to build tomorrow's world every day.

Funded by the European Union

X-CELERATE is an MSCA-Doctoral Network funded by the European Union, starting in December 2025 (GA No. 101227146).

Vision Lab is a research group of the Physics department at the University of Antwerp. The Vision Lab has unique expertise in reconstruction, processing and analysis of imaging data.
The working environment is strongly interdisciplinary, combining techniques and insights from Physics, Engineering, Mathematics and Computer Science. The group has a broad range of national and international collaborations with both academic and industrial partners. More details on Vision Lab's research are available at http://visielab.uantwerpen.be

About the offer

- The selected candidate will be employed by University of Antwerp for **36 months** on the MSCA-DN project. In line with university regulations and following a positive evaluation by the doctoral committee, University of Antwerp may provide additional funding for a maximum of 12 months to complete the doctoral degree.
- Doctoral candidates are offered a **competitive remuneration** based on the MSCA allowances and the regulations of the host institution. The gross monthly amount at the University of Antwerp corresponds to the amount for doctoral scholarship holders. Moreover, funding is available for technical and personal skills training and participation in international research events.
- **Expected start date**: between April and September 2026. We encourage last-year master students who will graduate by this time to already apply.

More information is available in the general information document for X-CELERATE positions.

Specific Profile requirements

- Your profile aligns with the general requirements and eligibility criteria of the X-CELERATE project.
- You have a master's degree in **physics, computer science, mathematics, engineering, or related field** (or will have by the time of your appointment).
- Background in **scientific computing and/or computed tomography** is appreciated.
- You are proficient in at least one programming language

How to apply

All applications must be submitted via the **X-CELERATE job platform.**

Deadline for applications: 16 November, 23:59. More information about the application procedure is available in the general information document for X-CELERATE positions.

Additional information

For additional information about the research project, contact:

Prof. Dr. Jan Sijbers
Email: jan.sijbers@uantwerpen.be

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