Doctoral candidate 5: Correlative phase-contrast 4DCT of shape-changing materials using synchrotron radiation and lab sources

Host Institution	Slovenian National Building and Civil Engineering Institute
PhD enrolment	University of Antwerp
Primary Supervisor	Dr. Lucia Mancini
Subject area	Multi-scale and correlative dynamic X-ray imaging

About this doctoral project and your tasks

You will develop correlative approaches to extract and merge information from multiple X-ray computed tomography (XCT) scales and modalities to investigate shape memory polymers and alloys, respectively. In particular, you will develop correlative imaging tools acquiring 3D and 4D (3D + time) data by a single lab instrument, when possible, or by a combination of instruments based on lab and/or synchrotron radiation (SR) sources, giving access to complementary information about the investigated specimens tested under realistic conditions. Phase-contrast 4DCT with SR could represent a golden standard for designed XCT measurements and should guide DC5 to optimise data collection and reconstruction strategies through XCT lab systems. Moreover, once the data have been acquired, in order to fully exploit the results and reliably interpret the dynamic behaviour of the selected shape-memory materials, information from different probes and/or acquisition modalities will be merged. This work will require developing both experimental and computational skills by the DC working in close collaboration with methods developers and materials designers and manufacturers.

Your tasks will include:

- Sample-driven protocols to analyse specific morphotextural and/or functional properties of shape-memory alloys (SMAs) and polymers (SMPs)
- Methods to correlate 3D data acquired in static and dynamic conditions by using different probes, scales and modalities

Foreseen secondments

For this project, we foresee secondments to:

- **Dr. Henning Markötter** (6 months) at Bundesanstalt für Materialforschung und – prufüng (Germany)
- **Eng. Fabio. Mercandelli** (3 months) at GFM (Italy)
- **Prof. dr. Christoph Heinzl** (3 months) at Fraunhofer IIS/EZRT (Germany)

Funded by the European Union

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

About the host institution and research group

The Slovenian National Building and Civil Engineering Institute (ZAG, https://www.zag.si) is a public research institute having the main headquarter in Ljubljana.
ZAG has 255 employees, is the leading Slovenian institute in the field of building and civil engineering but also strongly involved in circular economy projects, widely recognized by means of its experts, state-of-the-art equipment and multi-disciplinary work. It is involved in numerous national and international collaborations. Research work is focused on materials, either natural and artificial, including those potentially hazardous to human health, spanning from their characterization to novel solutions for recycling and reusing secondary raw materials. In this project, the 3D X-ray Imaging team in the Department of Materials will contribute to characterize smart material systems by a non-destructive approach, including testing in dynamic conditions to optimize their design and functional properties.

About the offer

- The selected candidate will be employed by the Slovenian National Building and Civil Engineering Institute for **36 months** on the MSCA-DN project.
- Doctoral candidates are offered a **competitive remuneration** based on the MSCA allowances and the regulations of the host institution. The gross monthly amount at ZAG will be 3.300€ 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 engineering, material science, mechanical 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.

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Additional information

For additional information about the research project, contact:

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