

# MSCA COFUND Doctoral Fellowships “Organic reactions under mechanochemical activation”

## Summary

*This PhD topic is part of the INNOCHEMBIO Doctoral Programme, which is funded through the Marie Skłodowska-Curie Actions (MSCA) COFUND action. The main objective of INNOCHEMBIO is to train future experts of sustainable chemistry and biotechnology, helping Europe to take the next steps in the green transition. This project aims to study the driving forces in mechanochemical reactions and learn to control reactivity in condensed matter. This PhD position will be hosted at TalTech with main supervisor Prof. Riina Aav and will contain a secondment to co-supervisor Prof. Tomislav Friščić at University of Birmingham (UK).*

Research field:	Chemistry and biotechnology
Supervisor:	Prof. Dr. Riina Aav
Availability:	This position is available.
Offered by:	School of Science Department of Chemistry and Biotechnology
Application deadline:	Applications are accepted between July 01, 2025 00:00 and August 31, 2025 23:59 (Europe/Zurich)

## Description

### 1. General description of programme and host

The PhD fellowship is part of the Marie Skłodowska-Curie Actions (MSCA) COFUND doctoral programme INNOCHEMBIO (<https://taltech.ee/en/innochembio>), which is co-funded by the European Union (Grant agreement 101217295). The main objective of INNOCHEMBIO is to train future experts to help Europe take the next steps in the green transition. The solutions and trained experts can reduce the environmental impact of the chemical and agricultural industries, offer eco-friendly analytical techniques, and assess the safety of new materials. INNOCHEMBIO funding will co-finance **15 PhD positions**, for which the application process in the first call will start on the **1st of July in 2025**.

For 12 PhD positions the hosting institution will be Department of Chemistry and Biotechnology (DCB) at Tallinn University of Technology (TalTech) which combines three divisions – Chemistry, Gene Technology and Biomedicine, and Food and Biotechnology. DCB is developing solutions to the great challenges of the 21st century – climate change, environmental protection, carbon neutrality, renewable energy, and biodiversity conservation. DCB hosts the second biggest PhD programme in TalTech with nearly a hundred enrolled students.

For 3 PhD positions the hosting institution will be the implementing partner – National Institute of Chemical Physics and Biophysics (NICPB). NICPB is a public research institution that conducts both fundamental and applied research, developing novel directions in fields ranging from material sciences to informatics. NICPB houses the Laboratory of Environmental Toxicology and several laboratories focused on fundamental research in NMR technologies with expertise dating back decades. The PhD training activities conducted by NICPB are funded through TalTech.

Importantly, each PhD project has one co-supervisor from another European country, which is detailed under the specific offer (see under supervisors' section). In total, INNOCHEMBIO has **19 associate partners from 11 European countries**.

### 2. Description of specific PhD project

Mechanochemistry has emerged as a sustainable synthesis tool, outperforming traditional organic synthesis in the solution phase, by avoiding the use of bulk solvents and minimizing the need for organic resources, which in turn reduces energy consumption and greenhouse gas emissions. Despite recent progress, the reactivity at the interface of solids and within the assisting liquid during mechanical activation is not yet well understood. Particularly intriguing is the reactivity between inorganic and organic compounds, enantioselective catalysis, and the synthesis of complex supramolecular building blocks. This project offers a future PhD student the opportunity to fill the gaps in understanding the driving forces and learn to control reactivity in condensed matter.

There will be two topic options to choose from: (1) developing a mechanistic understanding of mechanochemical reactions, or (2) developing dynamic covalent chemistry and non-covalent interaction driven synthesis of supramolecular systems. Both topics are expected to lead to the discovery of new mechanochemical transformations.

The successful synthetic protocols will be scaled up from mg scale to multigram scale using in-house mechanochemical equipment and, possibly, other techniques with the help of our academic collaboration network.

Experimental work will be conducted in chemistry research lab equipped with planetary and mixer mills, and suitable for organic synthesis, also access to various chemical analysis methods (like NMR, HPLC, MS, IR, UV, FS, CD, VCD, SC-XRD and PXRD) is available in the group.

PhD student will spend some part of PhD period in lab of Tomislav Friščić in University of Birmingham, UK and have opportunity to do internship in Novartis Basel, CH.

Link to the project: <https://taltech.ee/en/innochembio/aav>

### 3. Supervisory team

- Tallinn University of Technology (main supervisor): Prof. Riina Aav
- University of Birmingham (UK): Prof. Tomislav Friščić (The PhD student will stay 6-16 months at the co-supervisor's lab as mutually agreed upon).
- Tallinn University of Technology: Dr. Dzmitry Kananovich

### 4. Requirements

- Excellent command of written and spoken English.
- Compliance with the rules of INNOCHEMBIO (e.g. eligibility, adhering to MSCA mobility rules, etc.).
- The primary workplace will be in Estonia. Therefore, candidates from outside the EU must be eligible to obtain a visa. The position is expected to start in the first half of 2026.
- A master's degree or equivalent in organic chemistry or in relevant field.
- Strong knowledge of organic synthesis and NMR spectroscopy.
- A clear interest in the topic of the position.
- Strong and demonstrable writing and analytical skills.
- Capacity to work both as an independent researcher and as part of an international team.
- Capacity and willingness to provide assistance in organizational tasks relevant to the project.

### 5. Duties and Responsibilities

- Undertake postgraduate research for specific doctoral research project at TalTech or NICPB, respectively.
- Present and publish research in both academic and non-academic audiences. Attend and participate in academic and non-academic conferences, events and seminars.
- Attend and participate in all training events and supervisory meetings.
- Be seconded to the associated partner as necessary to fulfil the grant obligations.
- Prepare progress reports and similar documents on research for funding bodies, as required.
- Actively contribute to the public engagement and outreach activities of the project.
- The above job descriptions are not exhaustive, the PhD candidate may be required to undertake other tasks, which are broadly in line with the above duties and responsibilities.
- Full-time employment (40 hours per week), temporary contract for 4 years.

### 6. Eligibility requirements

- The applicant must be a doctoral candidate (i.e. not already in possession of a doctoral degree at the date of the recruitment).
- At the time of recruitment, the researcher must not have resided or carried out their main activity (work, studies, etc.) in Estonia for more than 12 months in the three years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not taken into account.

### 7. Benefits

- Competitive funding scheme, with a minimum gross monthly salary of EUR 2500. Topped by additional mobility allowances as well as optional family allowances (if applicable).
- Covered tuition costs, research costs and funding for short term mobility (i.e. conference attendance).

- Interdisciplinary and international research projects.
- Early-stage researcher position, with corresponding social and medical benefits in Estonia.
- Becoming a Marie Skłodowska-Curie PhD fellow.

## 8. How to Apply

All applications must be sent through TalTech's official application platform Glowbase and only applications submitted here will be considered for the programme. We ask the candidates not to contact the supervisors directly, in case of questions please write at [innocembio@taltech.ee](mailto:innocembio@taltech.ee). Each application must include the following material: CV, 1-page motivation letter, copies of BSc and MSc study records and diplomas, scanned copy of valid photo ID, 2 reference letters, eligibility statement.

**NB! The INNOCHEMBIO programme has additional requirements compared to the standard TalTech application process. Details on the exact nature of these documents and how to insert them in Glowbase can be found at our official INNOCHEMBIO website: <https://taltech.ee/en/innocembio/application-process>. If any of the required documents are missing, the candidate will not be eligible to proceed to the selection stage.**

## 9. Selection Process

The selection and recruitment process will be in accordance with the European Charter and Code of Conduct for the Recruitment of Researchers. The recruitment process will be open, transparent, impartial, equitable, and merit-based. There will be no overt/covert discrimination based on race, gender, sexual orientation, religion or belief, disability or age. To this end, the following selection criteria will be considered.

The application deadline is 31 August 2025. The application process will be carried out in 3 steps. In short, first an eligibility check is performed. All eligible candidates will proceed to stage 1, where they will be evaluated by independent evaluators based on the application documents. Lastly, shortlisted candidates from stage 1 will proceed to stage 2, where they will be interviewed via teleconference, which will be used to determine a candidate to whom an offer will be made. All candidates will be informed about the progress in due course after each step of the process. The selection process is described on the guide for applicants available here: <https://taltech.ee/en/innocembio/application-process>.

## 10. Disclaimer

By applying for this position, the applicants

1. give their consent to circulate their application and personal data within the INNOCHEMBIO consortium and with the evaluators;
2. confirm that the data provided is valid and accurate;
3. confirm compliance with the eligibility requirements;
4. commit to undertaking the planned secondment at the co-supervisor's institution.



To get more information or to apply online, visit <https://taltech.glowbase.com/positions/1031> or scan the the code on the left with your smartphone.