

Guidelines for Proposals for TUM GNI Projects – Call No. 5

Call closes: February 14, 2025, **11:59pm** (GTM+1)

1. General introduction

The Georg Nemetschek Institute Artificial Intelligence for the Built World at the Technical University of Munich (TUM GNI) is a flagship center for academic research, teaching and knowledge transfer to the society on artificial intelligence (AI), machine learning, data-centered engineering and related data and knowledge based technologies, with special dedication to applications in architecture, engineering, construction, operate & manage in built environment (AECOM). The built world (also denoted as the built environment), which implies the complete life cycle of buildings and built infrastructure, is the focus of the Institute.

The Nemetschek Innovation Foundation supports the Institute, and TUM embeds it in its large network of data-centered sciences. The Institute thus develops and promotes a new generation of technologies with strategic importance for digital sciences in general and AECOM industries in particular. It contributes to the solution of grand societal challenges including environment, climate, information & communications, mobility & infrastructure. Taking advantage of big data, extracting information by data analytics, creating insight from machine learning, AI for the Built World will be a key technology for designing, planning, constructing, operating and managing systems of buildings and built infrastructure.

TUM GNI funds a network of multidisciplinary research projects, flexible in the composition of its members and the precise research topics, yet always collaborative in the structure of each project. Projects in the TUM Georg Nemetschek Institute must always bring together researchers from the **AECOM domain with mathematics-/informatics-oriented researchers focusing on core scientific questions on Data Science and Machine Learning**. The scope of projects may include user acceptance and public/private spaces in responsive (smart) cities and more generally, trustworthiness. Also, AI fields such as intelligent user interfaces, explainable AI and probabilistic AI are welcome.

The Institute supports the network through funding of PhD candidates and their infrastructure. Projects are proposed by two to four TUM Principle Investigators (PIs) (for a total of 2 to 4 directly funded PhD candidates) and can be funded up to 4 years. One PI must be associated with the School of Engineering and Design (Departments of Aerospace and Geodesy, Architecture, Civil and Environmental Engineering, Materials Engineering, Mobility System Engineering) and the other with the School of Computation, Information and Technology (Departments of Mathematics, Computer Science, Computer Engineering)¹. Any PI can only submit one project proposal. The interdisciplinary collaborative projects are selected based on a suggestion of the Scientific Advisory Board of the Institute.

¹ Second affiliations with any of these departments/schools are acceptable.

2. Team setup and budget allocation

2.1. Principal investigators (PIs)

Proposals are submitted by a team of two to four TUM PIs. For eligibility of TUM PIs, the following regulation holds:

Any individual who is entitled to award doctoral degrees at TUM can act as PI: professors, emeritus professors, retired professors, TUM Distinguished Affiliated Professors, TUM Junior Fellows, or fellows of the TUM Institute for Advanced Study.

2.2. Project Team Leaders (PTL)

TUM GNI Project Teams are led by a PI, the Project Team Leader (PTL), who is responsible for setting-up the collaboration within the project, as well as the monitoring of its progress, financial controlling, interim and final reports. Project teams start with a kick-off meeting organized by the PTL introducing the team members. At the latest 24 months after that, each project team has to submit an *interim report* and a *final report* at the end of the project. A summary of the research activities has to be reported each year to the TUM GNI team.

The PTL will be the key contact for communication within the team and with the TUM GNI management. They will mediate in cases of conflict and support the PIs in their supervisory role. The PTL is also in charge of administration, the team budget and organizing team meetings. It is expected that the PIs and PhDs participate in the annual TUM GNI

General Assembly along other GNI TUM events.

2.3. Doctoral researchers

TUM GNI funds two to four doctoral researchers in the Project Teams. They are remunerated according to TVL-13.

TUM GNI Project Teams must ensure diversity (e.g. internationality, gender) in the team composition.

2.3.1. Direct project costs

TUM GNI Project Teams receive up to €4,000 per PhD candidate dedicated to funding direct project costs, e.g., computer equipment, chemicals, or laboratory equipment. The funds can also be used for recruitment costs, hosting project-relevant conferences, or inviting guests. *PIs (including their project-related travel) cannot be supported.*

2.3.2. Mobility funds

The doctoral researchers receive €2,000 per year for personal travel including prolonged stays abroad, conferences, research visits, etc.

The mobility budget may be supplemented by the direct project cost money (but not vice versa). It cannot be transferred from one doctoral researcher to another. A redistribution of the budget amongst potential doctoral researchers is possible only before the start of the project.

2.4. Student assistants

TUM GNI project teams may request up to €3,000 per year per Doctoral researcher to employ student assistants (master's students,

'WiHis'). *This money is earmarked and cannot be used for other purposes.*

3. Proposals

Central to the proposal are descriptions of the thesis projects of all participating doctoral researchers (including associated doctoral researchers). These descriptions should be supplemented by a summary of the research field and own preparatory work. Furthermore, the application must contain a concept that ensures **close cooperation between the members of the TUM GNI Project Team.**

Proposal must bring together researchers from the AECO domain (School of Engineering and Design, Departments of Aerospace and Geodesy, Architecture, Civil and Environmental Engineering, Materials Engineering, Mobility System Engineering) with mathematics-/informatics-oriented (School of Computation, Information and Technology, Departments of Mathematics, Computer Science, Computer Engineering) researchers focusing on core scientific questions on Data Science and Machine Learning. The scope of projects may include user acceptance and public/private spaces in responsive (smart) cities and more generally, trustworthiness. Also, AI fields such as intelligent user interfaces, explainable AI and probabilistic AI are welcome.

Proposals should include a rough work schedule and must be signed by the PIs and the nominated PTL. Submitted *proposals must not exceed 6 pages plus 2 pages per PI for the description of the planned thesis project of each doctoral researcher in length. The page limit (max. 10 pages for 2-PI-Team, max. 12 pages for 3-PI-Team and max. 14 pages for 4-PI-*

Team) excludes all appendices (in particular references and CVs of PIs).

The duration of the proposed projects is 4 years.

All project proposals are subject to an evaluation procedure performed by the TUM GNI Scientific Advisory Board and external referees.

To optimize the search for referees, we ask all PIs to provide (via separate email at the time of submitting the proposal) contact data (name, email, affiliation) for four individuals that are familiar with the research fields, but do not have conflicts of interest. In particular, they must not have joint publications or other scientific work with the proposing PIs. For further details, see Annex 1 – Proposal Template.

In a first step, the TUM GNI Scientific Advisory Board will review all proposals and examine whether an application matches the TUM GNI goals both conceptually and structurally. These aspects include primarily **interdisciplinarity** (plans for exchange across disciplines, regular team meetings, potential job shadowing initiatives within the team, etc.). *Projects not living up to the expected standards will be rejected and excluded from the subsequent reviewing process.*

Following this, proposals will be evaluated by two external referees. To this end, the board will usually select one referee from the proposer's suggestions and identify another themselves. The external reviewers will evaluate primarily scientific excellence, but consider the interdisciplinary requirements as well.

After that, the TUM GNI Scientific Advisory Board reconvenes and takes the final decision. In case of comparable reviews, the board will pay attention to further aspects.

Moreover, diversity is an aspect of increasing importance, which should be reflected in the proposal, e.g. by hiring female doctoral researchers and/or doctoral researchers from abroad.

4. Public relations

TUM GNI Projects will be published on the TUM GNI website. TUM GNI Project Teams shall establish links on their web pages to the TUM GNI website. They shall give credit to TUM GNI in all scientific activities (e.g., papers, conference contributions, etc.).

5. Miscellaneous

All funds are administered through TUM GNI and granted upon request and availability of funds. TUM GNI reserves the right to alter funding schemes at any time.

6. Appendix

- Annex 1 – Proposal Template