

The Engineering Risk Analysis Group at TUM is looking for a

PhD Position in Bridge Risk Assessment with Remote Sensing and Machine Learning

The project

Our infrastructure is aging, and decisions about its maintenance and safety increasingly depend on data. This PhD project will develop new methods that combine **remote sensing**, **physics-based modelling**, and **Bayesian machine learning** to support **risk management of bridge portfolios**. You will create tools that transform complex data into reliable insights for infrastructure safety and sustainability.

The project is a collaboration between the Engineering Risk Analysis Group at TUM and Prof. Maria Pina Limongelli at Politecnico di Milano, offering an excellent international research environment.

About us

The Engineering Risk Analysis Group at TUM develops and applies methods for **uncertainty quantification**, **engineering reliability**, and **risk & decision analysis** to support optimal and sustainable decision-making in engineering and environmental systems. We work at the interface of engineering, data science, and applied mathematics.

Your profile:

We are looking for a highly motivated candidate with:

- M.Sc. degree in a relevant field.
- Excellent academic performance.
- Experience with stochastic methods, risk and reliability analysis, and data analysis.
- Programming experience in Python, MATLAB, C/C++, or a similar language.
- Strong analytical and quantitative skills, with a keen interest in developing new methods.
- Proficiency in English (written and oral); knowledge of German is a plus.
- Strong communication skills and team player.

The position

- We offer a funded PhD position (75% TV-L E13), financed by the TUM Institute of Advanced Studies and the TUM Georg Nemetschek Institute of Artificial Intelligence for the Built World.
- You will develop **risk assessment methodologies** for bridges and civil infrastructure, which integrate remote sensing data with physics-based models into a **probabilistic decision support system**. You will establish a **systematic uncertainty quantification framework** for remote sensing data for bridges. This will be the basis for **Bayesian machine learning approaches** to predict bridge deformations and manage uncertainty. The project will leverage other data sources in the bridge portfolio to further reduce prediction uncertainty. Finally, the PhD will result in methods and tools to manage bridge portfolios with remote sensing data.
- The position is part of an international collaboration for which the PhD candidate will have the opportunity for an extended research visit at Politecnico di Milano, Milan, Italy.
- The earliest starting date is February 1, 2026.
- The successful candidate will be enrolled in the doctoral program of the Technical University of Munich.
- You can expect a dynamic and flexible work environment. We are located in the center of Munich.

Application

- Please send a **single PDF** including:
 - Your **CV**,
 - **Electronic copies of academic diplomas**, and
 - A **short cover letter** (max. one page) describing your interest in the position and your relevant experience.
- Send your application to: applications.era@ed.tum.de
- Applications will be **reviewed on a rolling basis**.
- Applicants with disabilities will be given preference if equally qualified.
- By submitting your application to the Technical University of Munich (TUM), you also confirm that you have taken note of the data protection information of the TUM according to Art. 13 Data Protection Basic Regulation (DSGVO) on the collection and processing of personal data in connection with your application.