


The Deutsches Geodätisches Forschungsinstitut of the Technical University of Munich ([DGFI-TUM](#)) is accepting applications for a

PhD position (m/f/d) in the research area Reference Systems with focus on ITRF scale realization

DGFI-TUM is one of the three ITRS Combination Centers, which are in charge of the realization of the International Terrestrial Reference System (ITRS). An accurate ITRS realization, the so-called International Terrestrial Reference Frame (ITRF), is foundational to many scientific and societal applications. The International Association of Geodesy's Global Geodetic Observing System (GGOS) requests an ITRF target accuracy of 1 mm and a long-term stability of 0.1 mm/yr. Recent ITRF solutions miss these requirements by about a factor of five. Largest limiting factors are biases between the contributing geodetic space observation techniques (VLBI, SLR, GNSS, DORIS) and discontinuities in observation time series.

One central datum parameter in the definition of the reference system is the scale. The ITRF scale is particularly relevant to all applications that are related to heights, for example the determination of sea level and its changes over time. In previous ITRF solutions, the scale was realized from VLBI and SLR observations over up to 45 years. Now, the availability of calibration data from the Galileo satellites has significantly improved the situation, since GNSS – the technique with the largest number of observations and the densest station network – can now contribute with independent scale information. At the same time, also the SLR scale is improving through the availability of new satellite calibration estimates (target signatures) and consistently estimated biases (range biases).

A new joint project of DGFI-TUM and the Astronomical Institute of the University of Bern (AIUB), Switzerland, now aims to investigate the joint capability of all three techniques VLBI, SLR and GNSS for an improved scale realization in future ITRF solutions. In this framework, DGFI-TUM's focus is on developing advanced combination approaches. The work will be supported by studies on the benefit of ESA's upcoming Genesis mission (2028), which will contribute to an improved combination of the techniques by linking them in space.

DGFI-TUM has long-standing expertise in the analysis, combination and exploitation of geodetic space techniques. The institute operates international analysis centers, which are involved in the determination of innovative geodetic results in close cooperation with partners worldwide. The basis for the investigations in our research area Reference Systems () is the widely known analysis and combination software DOGS that has been continuously expanded for decades in line with the latest scientific developments.

To strengthen our team, we are looking for a PhD candidate to advance the data analysis of geodetic space observations and develop combination strategies with a specific focus on the scale realization of geodetic reference systems. As a member of our DOGS development team, you will also contribute to the further enhancement of the software. You will cooperate closely with colleagues at AIUB and contribute to cutting-edge international research.

Your profile

- University degree (M.Sc.) in geodesy, mathematics, physics, informatics, or related
- Interest in data analysis and complex mathematical computations
- Advanced computer literacy and programming skills (DOGS is written in FORTRAN)
- Ability for independent research as part of a team, interest in the presentation and publication of scientific results
- Good command of the English language (speaking and writing)

We offer

- Independent and challenging research in an internationally well connected team
- Flexible and family friendly working hours
- Fixed term contract for a period of initially 3 years, starting as soon as possible
- Salary according to employment category E13 (full time) of the collective labor contract TV-L
- Attractive office in the Residence of Munich at the Odeonsplatz

All PhD candidates of the TUM are required to participate in the TUM Graduate School (<http://www.gs.tum.de>) that offers attractive additional funds for research training, soft-skill programs and international mobility/stays abroad. TUM strives to raise the proportion of women in its workforce and explicitly encourages applications from qualified women. Disabled applicants will be preferred in case of equivalent suitability, aptitude and professional performance.

Interested?

Do not hesitate to contact us for questions regarding the position. We are looking forward to receiving your application with relevant documents (🔗) per email (one PDF) not later than **30.11.2024** to:

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As part of your application, you provide personal data to the Technical University of Munich (TUM). Please view our privacy policy on collecting and processing personal data in the course of the application process pursuant to Art. 13 of the General Data Protection Regulation of the European Union (GDPR) at <https://portal.mytum.de/kompass/datenschutz/Bewerbung/>. By submitting your application you confirm to have read and understood the data protection information provided by TUM.