Technical University of Munich (TUM) is one of Europe’s top universities. It is committed to excellence in research and teaching, interdisciplinary education and the active promotion of promising young scientists. TUM has set up the International Graduate School of Science and Engineering (IGSSE) with funds from the Excellence Initiative.

The IGSSE concept is built on interdisciplinary research projects, a binding mentoring agreement and an individualized qualification program. The successful candidate will be integrated in the community of IGSSE, providing him/her with diverse offers for research and soft skills training as well as networking opportunities within TUM and beyond."

Applicants are invited for a PhD position of 36 months (stipend equivalent to TV-L E13 – with a positive interim evaluation required after 12 months) at the Chair for Computation in Engineering in the area of

**Computational bone fracture modelling with high order Finite Elements and Fictitious Domain Methods**

**Description:**

Fracture of bones is common in the elderly population due to osteoporosis, and is often initiated by falling on the side or on an out-stretched arm. Quantified computed tomography (QCT), combined with empirical data obtained by biomechanical experiments and computational mechanics may provide the means to enhance our understanding of this frequent injury. This interdisciplinary project includes four PhD students in an international team with members from TUM and Tel Aviv University, Israel. Its goal is the prediction of fracture risk by considering the interplay between micro-mechanical and macroscopic bone models, validated by experiments. The candidate to be hired for this particular position will focus on the computational mechanics part in the team. Based on extensive preliminary work on high order finite element and finite cell methods at the Chair for Computation in Engineering novel numerical fracture initiation and propagation models using a phase field model will be developed, implemented and validated in close collaboration with the experimentally oriented team members.

**Expertise and experience required:**

We are looking for a PhD candidate with a strong background in Computational Engineering. The applicant must have a good knowledge of object oriented programming in C++ with the interest to derive, implement and test cutting-edge mathematical models. The development will be embedded into an existing code managed by a team of fellow researchers in which an active participation beyond the applicants own research area is expected. This position requires interest and knowledge in the field of finite elements. Basic knowledge of mechanobiology is of advantage but not considered mandatory.

The candidate should be hard working, well organized and creative. Suitable candidates have a recent MSc degree in a related field, outstanding scientific research skills and a strong teamwork attitude.

**Requirements:**

- **Degree: Master degree**
- **Degree field: Computational Engineering**
- **Required Languages:** English (Excellent), German (good)

**Closing date for applications:** 1st February 2018.

TUM explicitly encourages applications from women as well as from all others who would bring additional diversity dimensions to the university. Preference will be given to disabled candidates with essentially the same qualifications.

Please send an electronic application (including an explicit and compelling cover letter demonstrating interest in and qualifications for the planned project, CV, certificates, and two letters of reference) as a single PDF via email to:

Prof. Dr.rer.nat. Ernst Rank  
Chair for Computation in Engineering  
Technische Universität München  
Munich, Germany  
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