

# Advanced modeling of structural limit states in marine structures

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## Summary

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*In this position you need to develop user defined subroutines in Abaqus software to be used in finite element simulations of metal and ice fracture in ultimate & accidental limit state analysis of marine structures.*

Research field:	Environmental, marine and coastal technology
Supervisor:	Mihkel Kõrgesaar
Availability:	This position is available.
Offered by:	School of Engineering Department of Civil Engineering and Architecture
Application deadline:	Applications are accepted between January 02, 2023 00:00 and January 22, 2023 23:59 (Europe/Zurich)

## Description

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Applications are invited for doctoral degree (DSc) position in Tallinn University of Technology. Project involves developing user defined subroutines that are used in ultimate and fracture limit state analysis of marine structures. For metal fracture simulations you need to implement and validate fracture model in shell mechanics framework that can account bending deformations by layerwise treatment of shell element integration points. Successful application of this approach would allow to consider bending deformations in fracture simulations with shell elements. The model development will be done inside FE software (Abaqus), and numerical simulations need to be validated with experiments. Validated model will be used to investigate strain path effects on fracture characteristics of metallic materials numerically and generate loading paths for data-driven machine learning based approaches.

### Requirements & Qualifications:

The call is open for candidates with a wide range of backgrounds inside and outside of Estonia. Most importantly, high level of interest and motivation towards, and deep understanding on, solid and computational mechanics is required. A suitable background may come from mechanical/material engineering, marine engineering, civil engineering, engineering physics, applied or computational mechanics, or related disciplines. Prior experience on working with FE codes LS-DYNA or ABAQUS is a significant advantage and skills with programming tools Matlab, Python or Fortran is considered as a plus as these will be used during the work. The candidate should prove his/her capabilities in writing the technical report and scientific papers in high quality journals. Experience in collaborative research/publication with the existing TalTech staff is also a plus. The applicant for the position must have a Master's degree and must fulfill the requirements for doctoral students at the Tallinn University of Technology.

During the assessment emphasis will be put on your potential for research, motivation and personal suitability for the position.

### Employment:

The position is at the Tallinn University of Technology and includes work as a teaching assistant in our courses. The expected duration of doctoral studies is four years, but a contract is first made for one year, and the extension is subject to the advance of studies and research. The salary is according to the salary system of Tallinn University of Technology.

### How to apply for a doctoral candidate position

The application material includes:

1. Motivation letter (maximum one A4 page, important: provide clear, but honest, evidence of your skills related to the job description and requirements above)
2. CV and other proof of scientific activity (publications, conference papers etc.)
3. A certified copy of the master's degree certificate and an official transcript of records, and their translations, if the originals are not in English. In the first stage, the unofficial documents may also be accepted.

4. An English abstract or summary of the MSc thesis.
5. Introducing two referees who can be contacted, directly.
6. Proof of proficiency in English

**All material should be submitted in English.**

#### **Further information**

- • Job locations Kuressaare & Tallinn.
- For additional information, please contact Assistant Professor Mihkel Kõrgesaar (email: [mihkel.korgesaar@taltech.ee](mailto:mihkel.korgesaar@taltech.ee)).



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