fortiss is a non-profit research and transfer institute associated with the Technische Universität München. Its main focus is on software, systems, and service engineering.

A major topic of research at fortiss is the development of tools to support the software development process. In particular, supporting the construction and certification of software for the automotive and aerospace domains is the subject of several projects currently starting or ongoing at fortiss. To help us in building these next-generation tools, we are currently looking for:

**MSc student (m/f)**

On the topic: «Usability and scalability of textual notations vs graphical notations for model transformation languages»

Model transformation is an activity that broadly encompasses any kind of computation that transforms one artifact into another during the software development process. An example of a typical model transformation is the conversion a model of a car's cruise-control system into a format that can be interpreted by a tool that can perform safety analysis. Model transformations are pervasive in industrial processes and often provide the glue between the different tools in a software development tool-chain. They do so by converting artifacts produced by a tool into the appropriate format for consumption by another tool.

Model transformation languages are in many ways similar to to programming languages, but allow expressing computations on models, often specific to domains such as for example the automotive or aerospace. During this MSc thesis the student is expected to explore the relation between graphical and textual notations for model transformation languages. For this purpose a graphical model transformation language called DSLTrans (<http://msdl.cs.mcgill.ca/people/levi/35_software>) is provided and the student is expected to build a textual notation for the language to improve its usability, in particular the speed at which model transformations can be written in DSLTrans.

The project will be developed on top of the cutting edge Eclipse and MPS (from JetBrains, the authors of the IntelliJ IDEA and PyCharm) platforms. The concrete goal of the project is to create a textual Domain Specific Language (DSL) in MPS that mimics the graphical language already existing in Eclipse. Bidirectional exchange between the two formats should also be supported to allow for seamless usage of the back-end model transformation language engine, regardless of the front-end used to develop the model transformation specification itself.

In a broader context this work should be used as a case study for a deeper analysis of the advantages and disadvantages of graphical and textual notations in the field of graph-based model transformations.

We expect:

* An excellent Bachelor degree in computer science.
* Good software development skills and the willingness to join a fast-pace software development team.
* Very good knowledge of English and German.

We appreciate:

Interest in at least a few of the following areas: model transformations; software verification; projectional editors; Integrated Development Environments in general; the automotive and the aerospace domains; embedded systems.

We offer:

* Excellent research environment in a research group associated with the Technische Universität München, which is top-ranked in Germany.
* Collaboration with leading research groups and industrial partners.
* Support for further career development in academia, industry, or as an entrepreneur.

Contact:

For further inquiries do not hesitate to contact Levi Lúcio (lucio@fortiss.org).