

Call for Applications:

Ph.D. Student for Design Automation for the European Train Control System (m/f/d, full time E13)

We are an active and lively research group which is passionate about science. We are working in an environment that may best be characterized by the passion to accomplish something new—complemented by teamwork and fostering personal relationships. From assistants, students, researchers, postdocs to professors; we are all working hand in hand, are highly committed and engaged with our work. We know how to celebrate our successes, but also how to get through setbacks together!

In the next months, we are going to extend our research group at the Technical University of Munich (www.cda.cit.tum.de). Accordingly, we are currently searching for a Ph.D. Student to join our team to work on **Design Methods for the European Train Control System!**

Our Research

The European Train Control System (ETCS) strives to harmonize and improve train control systems throughout Europe. One particular aspect is the utilization of virtual subsections which allow for a much higher degree of freedom and provide significant potential for increasing the efficiency in today's train schedules. While this certainly provides a great deal of freedom and potential for improvements, utilizing this potential is a highly non-trivial task which, thus far, mainly relied on manual labor. In our work, we aim for introducing methods for design automation which aid designers in tackling those tasks. In the future, we are aiming to extend our activities into one or more of the following directions:

- Methods and software tools for the design and validation of ETCS systems
- Modeling search problems with realistic train movements
- Heuristics for determining railway layouts and train schedules
- Verification of the correctness and safety of train layouts/schedules
- Scaling train scheduling with virtual subsections to real-life scenarios
- Modelling, analysis, verification, and validation for ETCS Level 3
- Combined approaches to ensure safety (safety by design)
- Validation according to ETCS standards
- Evaluation of system capacity, energy consumption, and costs
- Tool and model integration

To learn more about our previous work, please check out our website (www.cda.cit.tum.de/research/etcs/) and open-source implementations referred therein.

Your Profile

We are looking for a Ph.D. student who is willing to learn and explore new topics while playing nice in a team. Your main task will be the development, conceptualization, and eventual implementation of new design automation, simulation, and verification methods for ETCS. Our focus on interdisciplinary partnerships and networks will enable you to meet many interesting people (at places all over the world) and present your work at top-notch conferences and journals in our domain.

You should have completed your Master/Diploma studies with top grades in Computer Science, Artificial Intelligence, Mathematics, Electrical Engineering, or a similar subject. Most importantly, you should be creative, passionate about research, driven by curiosity, and be able to think outside-of-the-box. You will need strong coding skills to design highly efficient algorithms. Solid knowledge in the areas of algorithmics, optimization problems, as well as experience with SAT/SMT solvers or machine learning is an advantage.

Join our Team

While we are obviously interested in your CV and background (if applicable, please also add your list of publications, projects, cooperations, etc. as well as your GitHub profile). Most importantly, however, tell us what motivates you to join our team and work on ETCS. Let us know why you would be a great candidate! We are looking forward to hearing from you! Please send your application (in English or German) to Prof. Dr. Robert Wille (robert.wille@tum.de).

Severely disabled applicants will be given preference if they are essentially of the same suitability and qualifications. The Technical University of Munich aims to increase the proportion of women, so applications from women are expressly welcomed.

Note on data protection

As part of your application, you transmit personal data. Please note our data protection information in accordance with Article 13 of the General Data Protection Regulation (GDPR) on the collection and processing of personal data as part of your application (see <https://portal.mytum.de/kompass/datenschutz/Bewerbung/>). By submitting your application, you confirm that you have taken note of TUM's data protection information.