

Driving decarbonization and digitalization. Together.



Doctoral Thesis: Functional Software Generation (f/m/div)*

Job description

The industrial doctorate at Infineon: Pursue a doctoral degree at a university and gain professional experience simultaneously - an ideal start for your career. Advance your research with us and profit from our vast network of doctoral candidates and the expertise of a university. Mentorship is handled by both professors and dedicated Infineon employees. We are offering a doctoral thesis dealing with code generation, which is a widely accepted approach to boost design productivity be it in hardware (RTL HDL) or software (C, C++,). The generation covers at the moment mainly structural aspects as RTL netlists or C++ class diagrams. Functionally is only rarely supported, and if then state diagrams only. Since state diagrams are inefficient to describe e.g. DSP functionality, it becomes clear, that generation of functional software is quite limited today. That is the starting point for this PhD thesis. The goal is to enable and proof the benefit of functional software generation. We offer: • Realistic, challenging, and impactful problems • The possibility of putting problems into an overall context • Collaboration with colleagues and teams that is seldom found anywhere in the world in terms of depth and breadth • A potential 3 months research stays at top universities worldwide and / or Europe wide cooperation of experts as part of funded research activities • An Infineon internal PhD community The thesis will be written in cooperation with Technical University Munich and under the supervision of Prof. Dr. Wolfgang Ecker.

The tasks within the thesis will consist of:

- A generic approach for **modeling functionality in a language independent way**
- Mapping of this target independent model to a **target code specific model** and **generation of code** by un-parsing target code specific models
- Targeting **C, C++ and RUST** and as an optional extension SystemC, VHDL and Verilog functional code
- **Assembler and special instruction support** in models and translation to target code
- **Multi-Precision Floating Point in SW** for general and specialized hardware for AI and DSP
- Provide an **end-to-end validation with RISC-V** as a target processor
- **Open Source Contribution**

This doctoral thesis should also study existing approaches and prove the applicability and get feedback to enhance the methodology.

The learnings out of the thesis will be:

- Generic **firmware and hardware design** and implementation

At a glance

Location: **Munich (Germany)**
Job ID: **HRC0198827**
Start date: **as soon as possible**
Entry level: **0-1 year**
Type: **Full time**
Contract: **Temporary**

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Job ID: **HRC0198827**
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Contact

Silke Jaschik
Recruiter



- **Methodology of 'code generation'** in an industrial environment
- **Modeling and Meta-Modeling**
- Various **Modeling and Abstraction concepts** and their implementation

Profile

A doctoral student is a research enthusiast,

- › whose interests are scientific research combined with the passion for Infineon's innovative products and applications.
- › who enjoys working in an industrial environment in combination with an Infineon partner university.
- › who appreciates open communication and the contribution of an international environment.
- › and is thus an excellent candidate for a further academic or industrial career after completion of their thesis.

As the ideal candidate you:

- Graduated in **computer engineering, electrical engineering** or a related field with very good grades
- Are interested in **complex, interdisciplinary and interlinked tasks** and should like to solve them together with colleagues
- Possess **good presentation skills**, helping you to present challenging issues clearly and simply
- Are **curious and open** as well as **interested in learning and trying out new things**
- Gained **first experience with metamodeling**, (template-based) **code generation** and/or **model-driven architecture**
- Have knowledge in **object-oriented programming** with languages such as **C++ and Python** and embedded programming with C and/or Assembler
- Possess **good knowledge of digital design and RTL modeling** in VHDL and/or (System)Verilog and embedded system architectures
- Are **interested in generation and recursive application of generation**, e.g. generation of generators
- Possess very good language skills in **English and ideally German**

Benefits

- **Munich:** Coaching, mentoring networking possibilities; Wide range of training offers & planning of career development; International assignments; Different career paths: Project Management, Technical Ladder, Management & Individual Contributor; Flexible working conditions; Home office options; Part-time work possible (also during parental leave); Sabbatical; On-site creche and kindergarden with 220 spots, open until 5:30pm; Holiday child care; On-site social counselling and works doctor; Health promotion programs; On-site gym, jogging paths, beachvolleyball, tennis & soccer court; On-site canteen; Private insurance offers; Wage payment in case of sick leave; Corporate pension benefits; Flexible transition into retirement ; Performance bonus; Reduced price for public transport and very own S-Bahn station; Access for wheelchairs; Possibility to work remotely from abroad (EU)

Why Us

Driving decarbonization and digitalization. Together.

Infineon designs, develops, manufactures, and markets a broad range of semiconductors and semiconductor-based solutions, focusing on key markets in the automotive, industrial, and consumer sectors. Its products range from standard components to special components for digital, analog, and mixed-signal applications



to customer-specific solutions together with the appropriate software.

The central R&D organization „**Design Enabling and Services**“ (DES) provides the design environment to the different Infineon product development teams. With state-of-the-art design methods, building blocks and a wide range of product development services DES supports Infineon's advanced IC development from early high-level system models to verified products ready for manufacturing.

** The term gender in the sense of the General Equal Treatment Act (GETA) or other national legislation refers to the biological assignment to a gender group. At Infineon we are proud to embrace (gender) diversity, including female, male and diverse.*

