



Doctoral Thesis: On Systematic Composing RTL-Code Generators (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. RTL-Code generation is named by worldwide renowned universities but also proven at Infineon to be a powerful mechanism to increase design speed, design productivity and in some aspects also design quality (consistency, copy-paste-error avoidance). RTL-Code generation approaches productivity – as the name says - by automation and leaves open clustering and abstraction. Therefore, building and structuring generators is driven by the software structure, which they represent. Since the generator/software structure may not naturally match the structure of the underlying hardware, the concept of generator re-use but hardware (soft-IP) reuse is hard to follow. There are known publications covering some aspects of systematic hardware generation. None of these approaches however addresses the challenge of different structuring demand for the generated hardware and the software of the generator. Also, the formalisms used so far are conceptually related UML/SysML diagrams and their underlying formalisms, i.e. consider the software engineering part of building a generator. This doctoral thesis should study the existing hardware and software generation approaches and pursue for a methodology for hardware inspired generator construction. In parallel, this thesis should model state-of-the-art CPUs and CPU peripherals with the newly developed method to prove the applicability and get feedback to enhance the methodology. 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:

- Building an **overview of the state-of-the-art of digital hardware generator approaches**
- Studying **state-of-the-art abstraction methods, developing a generic abstraction method** and **defining boundaries and requirements** for the searched methodology
- Defining and formalizing of the **new generator structuring approach**
- **Implementating the generator structuring approach** and **application to modeling a SoC and its components**
- **Generating RTL code and synthesizing it to FPGAs** (and ASICs) to prove the seamless integration of the methodology in today's RTL design flows

The learnings out of the thesis will be/lead to

- **Methodology of 'code generation'** in an industrial environment

At a glance

Location: **Munich (Germany)**
Job ID: **346132**
Start date: **as soon as possible**
Entry level: **0-1 year**
Type: **Full time**
Contract: **Temporary**

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Contact

Silke Jaschik
Student Attraction Manager



- **Various Modeling and Abstraction concepts** and their implementation
- Comprehensive consideration of **HW solutions and architecture trade-offs**

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
- Show **curiosity and openness** as well as **an interest in learning and trying out new things**
- Already gained first **experiences with metamodeling, (template-based) code generation and/or model-driven architecture**
- Are **experienced with object-oriented programming** (e.g. C, C++ or Python)
- Possess **good knowledge of digital design and RTL modeling** in VHDL and/ or (System) Verilog; RTL synthesis as a plus
- **Good knowledge of processors and SoC architecture**
- **Very good English skills** and ideally German language skills

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 120 spots, open until 6pm; 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

Why Us

Part of your life. Part of tomorrow.

Infineon is a world leader in semiconductor solutions that make life easier, safer, and greener. Our solutions for efficient energy management, smart mobility, and secure, seamless communications link the real and the digital world.

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.

