

## Master thesis / Diploma thesis topic at NaMLab

**Group:** Emerging Reconfigurable Devices, NaMLab gGmbH, Dresden

**Start:** as of now

**Applicability:** Open to students enrolled at TU Dresden only

### Background

Reconfigurable field-effect transistors (RFETs) can be switched between n-type and p-type operation during runtime through an additional program gate. This lets a single device take over functions that need several transistors in conventional CMOS. The result is more compact logic, run-time reconfigurable circuits, and new approaches to hardware security. Making use of these advantages requires dedicated design and layout methods, because standard CMOS design flows do not cover polarity-switchable devices.

### Your tasks

- Literature review on RFET device concepts and RFET-based circuit design
- Design of RFET-based logic cells (e.g. reconfigurable NAND/NOR, XOR/XNOR)
- Physical layout of devices, cells and test structures in KLayout and Cadence Virtuoso
- Circuit simulation using RFET compact models [SPICE / Verilog-A]
- Benchmarking against CMOS equivalents: area, transistor count, delay, energy
- Documentation and presentation of results
- Optional: TCAD Simulation of RFET device Physics

### Your profile

- Enrolled at TU Dresden in Electrical Engineering, Nanoelectronic Systems, Mechatronics, Physics or a related program
- Solid knowledge of semiconductor devices and digital and/or analogue circuit design
- Experience with layout or circuit simulation tools is an advantage
- Scripting skills (Python, or similar) are a plus
- Fluent in English. German language skills are a plus
- Independent, structured way of working

### What we offer

- A topic at the interface of device technology and circuit design
- Close supervision in an international research team
- Work in an industry-oriented research environment
- Opportunity to contribute to scientific publications

### Supervision

Jens Trommer, NaMLab gGmbH, together with Professor Thomas Mikolajick, Chair for Nanoelectronics, TU Dresden

### Application

Please send your CV, current transcript of records and a short motivation statement to:  
[your.thesis@namlab.com](mailto:your.thesis@namlab.com)

By sending us your application documents, you agree to the use of your personal data for the purpose of the application procedure.