

# Laura Harms

## IoT and Embedded AI Systems Researcher

Kiel, Germany

🏠 lauraharms.eu | ✉ mail@lauraharms.eu

### SUMMARY

---

Systems researcher with 7+ years of experience in IoT, wireless communication, and embedded AI. I like to build smart embedded systems, both through designing protocols for efficient low-power wireless communication and building TinyML solutions.

Proficient in C, Python, TensorFlow, TensorFlow Lite for Microcontrollers, low-power communication protocols (IEEE 802.15.4, Bluetooth Low Energy, LoRa), and embedded operating systems (Contiki-NG, Zephyr).

Team-oriented, I supervised 20+ theses and projects during my research career. I worked and studied at 5 universities in 3 countries.

### EXPERIENCE

---

#### Researcher

**May 2019 – Present**

Kiel University

Kiel, Germany

- Designed and implemented communication protocols for low-power IoT (IEEE 802.15.4, Bluetooth Low Energy)
- Designed and implemented TinyML solutions for constrained embedded devices (TensorFlow Lite for Microcontroller)
- Authored 6+ papers at international conferences and journals: Elsevier Computer Networks, DCOSS-IoT, DAC, LCN
- Supervised 20+ M.Sc./B.Sc. theses and student projects, with some leading to papers at international conferences
- Created and taught labs and seminars in IoT, TinyML, Computer Networks, and IT Security

#### Researcher

**Oct. 2017 – Apr. 2019**

Chalmers University of Technology

Gothenburg, Sweden

- Designed and implemented communication protocols for low-power IoT (IEEE 802.15.4, Bluetooth Low Energy)
- Supervised 4+ M.Sc. student projects
- Taught labs in B.Sc. courses in Embedded and Real-Time Systems, and Computer Networks

#### Scientific Programmer

**Sep. 2011 – Aug. 2014**

Forschungszentrum Jülich (Research Center)

Jülich, Germany

- Implemented front-end software for research in stratosphere physics using Python
- Developed and implemented a temperature regulation system for an infrared spectrometer in C

### EDUCATION

---

#### Doctorate of Engineering

**Oct. 2017 – May 2024**

Chalmers University of Technology

Gothenburg, Sweden

- Title: "Adaptive and Resource-Efficient Systems for the Internet of Things: Protocols, Systems, and Evaluation Infrastructures"
- Supervisor: Prof. Dr. Olaf Landsiedel (Kiel University & Chalmers University of Technology)
- Key courses: Neural Networks and Deep Learning, Autonomous Learning, Advanced IoT Topics
- Leadership courses: Team Management and Leadership, Research Ethics and Sustainability, Teaching and Education, Personal Efficiency

**Licentiate of Engineering**  
Chalmers University of Technology

**Oct. 2017 – Dec. 2021**  
Gothenburg, Sweden

- Intermediate degree on the way to PhD in Sweden
- Title: "Long-Term Stable Communication in Centrally Scheduled Low-Power Wireless Networks"
- Supervisor: Prof. Dr. Olaf Landsiedel (Kiel University & Chalmers University of Technology)

**M.Sc. in Embedded Systems**  
Uppsala University

**Sep. 2014 – Sep. 2017**  
Uppsala, Sweden

- Thesis title: "Modulation schemes in ambient backscatter communication"
- Supervisor: Ambuj Varshney (Uppsala University)
- Reviewer: Prof. Dr. Christian Rohner (Uppsala University)
- Key courses: Microcontroller Programming, Real-Time Systems, Wireless Communication and Networked Embedded Systems
- Semester abroad at University of Southern Denmark with courses on Robotics, Computer Vision, and Artificial Intelligence

**B.Sc. in Scientific Programming**

**Sep. 2011 – Aug. 2014**  
Jülich, Germany

FH Aachen University of Applied Sciences - Campus Jülich

- Thesis title: "Development of a Temperature Regulation System for Cooling an Infrared Detector using an Arduino Yún" (German title: "Entwicklung einer Temperatursteuerung für die Kühlung eines Infrarotdetektors unter Verwendung eines Arduino Yún")
- Supervisors: Prof. Dr. Andreas Terstegge (FH Aachen University of Applied Sciences), Dr. Martin Kaufmann (Forschungszentrum Jülich)
- Integrated degree program with vocational training as "Mathematical-Technical Software Developer"
- Courses in Applied Mathematics and Applied Computer Science

## SKILLS

---

**Programming** C, Python

**Wireless & IoT** IEEE 802.15.4, Bluetooth Low Energy, LoRa, Contiki-NG, Zephyr OS

**Machine Learning** TensorFlow, TensorFlow Lite for Microcontroller, Keras

**Soft skills** Team management, Leadership, Teaching, Technical Writing

**Languages** German (native), English (fluent), Swedish (intermediate), Danish (basic), French (basic)

## AWARDS & SCHOLARSHIPS

---

**Best Paper Award** Intl. Conf. on Distributed Computing in Sensor Systems (DCOSS) **2022**

**Deutschlandstipendium** **2012–2013**

## SELECTED PUBLICATIONS

---

- [1] **TSCH meets BLE: Routed Mesh Communication over BLE**, L. Harms, O. Landsiedel, International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT), 2023
- [2] **Grace: Low-Cost Time-Synchronized GPIO Tracing for IoT Testbeds**, L. Harms, C. Richter, O. Landsiedel, Elsevier Computer Networks, vol. 228, 2023  
*Extended version of the best paper award winner at DCOSS 2022 under the same name*
- [3] **BlueSeer: AI-Driven Environment Detection via BLE Scans**, V. Poirot, L. Harms, H. Martens, O. Landsiedel, Design Automation Conference (DAC), 2022
- [4] **Opportunistic Routing and Synchronous Transmissions Meet TSCH**, L. Harms, O. Landsiedel, IEEE Conference on Local Computer Networks (LCN), 2021
- [5] **Master: Long-Term Stable Routing and Scheduling in Low-Power Wireless Networks**, L. Harms, O. Landsiedel, International Conference on Distributed Computing in Sensor Systems (DCOSS), 2020
- [6] **LoRea: A Backscatter Architecture That Achieves a Long Communication Range**, A. Varshney, L. Harms, C. Pérez-Penichet, C. Rohner, F. Hermans, T. Voigt, ACM Conference on Embedded Network Sensor Systems (SenSys), 2017