

# Zhenrong Lang

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## EDUCATION

- ETH Zürich** Sep 2023 - Jul 2026
  - MSc in Electrical Engineering and Information Technology; GPA: 5.7 (Scale: 6.0 - 1.0) Zürich, Switzerland
  - Courses: Hardware Security, Computer Architecture, Artificial Intelligence, Digital Circuits Design, Computer Networks*
- ETH Zürich** Sep 2020 - Jul 2023
  - BSc in Electrical Engineering and Information Technology; GPA: 5.52 (Scale: 6.0 - 1.0) Zürich, Switzerland
  - Best BSc Thesis Award: Characterizing New Rowhammer Effects, supervised by Prof. Dr. Kaveh Razavi*
- Schule Schloss Salem** Sep 2016 - Jul 2020
  - Abitur (German High School Graduation); Grade: 1.4 (Scale: 1.0 - 6.0) Baden-Württemberg, Germany
  - Ferry Porsche Preis: For outstanding performance in Maths and Physics*
  - The Gold Standard of the Duke of Edinburgh's International Award*

## SKILLS SUMMARY

- Languages:** English, German, Chinese
- Programming:** C, C++, Python, SystemVerilog, RISC-V Assembly
- Tools:** Linux, Docker, Git, Matlab, Vivado, Altium (PCB Design), Qucs (Circuit Simulation)
- Frameworks:** CUDA, Scikit, NumPy, PyTorch

## PUBLICATIONS

- BLASTER: Characterizing the Blast Radius of Rowhammer** Jun 2023
  - Zhenrong Lang**, Patrick Jattke, Michele Marazzi, Kaveh Razavi ETH Zürich
  - Third Workshop on DRAM Security (DRAMSec), co-located with ISCA 2023*

## WORK EXPERIENCE

- Shanghai Huizhong Automotive Manufacturing Co., Ltd** Jul 2019 - Aug 2019
  - Computer Aided Design Engineer Intern Shanghai, China
  - Modeled auto parts with finite element method using Altair HyperMesh
  - Identified and analyzed hotspots of different auto parts using Altair HyperView
  - Simulated multibody vehicle structures and analyzed their behavior over time using MSC Adams
- Daimler AG** Feb 2018 - Mar 2018
  - Software Engineer Intern Stuttgart, Germany
  - Programmed a humanoid robot Pepper manufactured by SoftBank Robotics as a receptionist for answering questions and hosting events using Python
  - Supported and maintained the usage of Microsoft HoloLens for customers to see the inside structures of cars with augmented reality

## RESEARCH EXPERIENCE

- Rowhammer Blast Radius Characterization** Feb 2023 - Jul 2023
  - Supervisor: Prof. Dr. Kaveh Razavi ETH Zürich
  - Motivation:** To better understand the interaction between existing and emerging Rowhammer effects and how the growing blast radius and new Rowhammer patterns manifest in modern DDR4 DRAM devices
  - Designed and implemented characterization experiments using an FPGA-based DRAM testing infrastructure
  - Characterized the impact of far aggressors on 24 commodity DRAM chips from three major DRAM vendors
  - Result:** Showed that activations up to four rows apart from a potential victim row contribute to Rowhammer
- Vector Processor within an FPGA-based DRAM testing infrastructure** Feb 2022 - Jul 2022
  - Supervisor: Dr. Hasan Hassan ETH Zürich
  - Motivation:** To speed up experimental characterization and analysis of existing cutting-edge DRAM chips for Row-Hammer-induced errors or retention errors evaluation
  - Improved and optimized an FPGA-based DRAM testing infrastructure in SystemVerilog that enables the programmer to perform all low-level DRAM operations (i.e., DDR commands) in a cycle-accurate manner
  - Implemented a vector-processor-like execution engine on FPGA that supports operations to post-process data read from the DRAM device using SystemVerilog

- Pipelined and processed the 512-bit data coming from DRAM to locate bit flips in each read cycle
- **Result:** Accelerated programs for new DRAM characterization studies related to performance, reliability, and security

- **Simulator for NAND Flash-Based SSDs** *Sep 2021 - Jan 2022*  
ETH Zürich
  - Supervisor: Prof. Dr. Jisung Park
  - **Motivation:** To build a practical SSD simulator, which supports advanced features of modern NAND flash chips and essential SSD-management tasks
  - Designed and implemented a practical state-of-the-art simulator for high-end SSDs in C++, which supports progressive garbage collection
  - Parameterized the number of valid pages to move per garbage collection step and the number of user requests to perform between two garbage collection steps
  - Explored the performance impact of progressive garbage collection under MSR Cambridge and Filebench Suites
  - **Result:** Reduced device response time and end-to-end request delay using the progressive garbage collection policy

## TEACHING ASSISTANT

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- **Introduction to Machine Learning** *Feb 2023 - Jun 2023*  
ETH Zürich
  - Instructor: Prof. Dr. Andreas Krause
  - Held tutorial sessions on neural networks for around 1000 students
  - Worked through example exercises and illustrated how to build neural networks using PyTorch
- **Introduction to Partial Differential Equations** *Sep 2022 - Dec 2022*  
ETH Zürich
  - Instructor: Prof. Dr. Mikaela Iacobelli
  - Taught and led a class of 40 engineering students weekly throughout the semester
  - Designed weekly exercise sheets and corrected handed-in exercises by students

## ACADEMIC PROJECTS

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- **Simple kernel for RISC-V** *Feb 2021 - Jul 2022*  
ETH Zürich
  - Course: Computer Engineering
  - Implemented a kernel in C and RISC-V Assembly, which manages resources such as memory and devices, and provides secure support for running applications
  - The kernel features physical memory management (buddy allocator), virtual memory management (paging), scheduler, and user application support
- **Neural Network for food flavour detection** *Feb 2021 - Jul 2022*  
ETH Zürich
  - Course: Introduction to Machine Learning
  - Given images of food, classified and grouped the images by similarities of flavors
  - Built a multilayer perceptron on top of the ResNeXT Embeddings and transferred learned features from the images for flavor detection
  - Trained with Triplet Loss and regularized with dropout to predict similarities of flavors

## HONORS AND AWARDS

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- **Best Bachelor Thesis Award** *Jul 2023*  
Switzerland
  - Department of Information Technology and Electrical Engineering, ETH Zürich
- **Ferry Porsche Preis** *Jul 2020*  
Germany
  - Awarded for outstanding performance in Maths and Physics
- **The Gold Standard of the Duke of Edinburgh's International Award** *Jul 2020*  
Germany
  - Awarded for outstanding performance during high school
- **Mathematics Open Day (Tag der Mathematik)** *Mar 2019*  
Germany
  - 3rd Place in the Team Competition
- **Baden-Württemberg State Mathematics Competition** *Jan 2017*  
Germany
  - 1st Place in the First Round
- **American Mathematics Contest 8** *Nov 2015*  
China
  - Honor Roll of Distinction (top 1%)