Rishabh Ravi

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Rishabh Ravi
http://github.com/borlaugg
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Education

2025 – **University of Illinois, Urbana-Champaign, USA** 3.55/4 GPA
PhD in Electrical and Computer Engineering

2020 – 25 **Indian Institute of Technology Bombay, India** 9.32/10 GPA
Bachelors and Masters of Technology in Electrical Engineering
Specializing in Electronic Systems (ES)
with Minor in Computer Science and Engineering

Publications

SCAM: Secure Shared Cache Partitioning Scheme
Varun Venkitraman, **Rishabh Ravi**, Tejeshwar Torwade, Nirmal Boran, Virendra Singh
Published in International Conference on Security and Cryptography (SECRYPT) 2025

Hardware vs. Software Implementation of Warp-Level Features in Vortex RISC-V GPU
Huanzhi Pu, **Rishabh Ravi**, Shinnung Jeong, Udit Subramanya, Euijun Chung, Jisheng Zhao, Chihyo Ahn, Hyesoon Kim
Published in Open Source Solutions for Massively Parallel Integrated Circuits at DATE 2025

Professional Internships

2023 **Modem Firmware Engineer** *Guide: Mr. Dileep Lingamallu | Qualcomm*
- Revived a **GPRS-specific** modem firmware and virtual platform for applications in **smartwatches**
- Created test case scenarios, emulating L1 commands, to assess and validate functionality by maintaining signal-to-noise ratio within defined **21 dB** thresholds, affirming the accuracy of decoded data

2022 **Parallel Computing & Profiling** *Guide: Mrs. Tanmaya Karmakar | Nvidia*
- Worked in a team to parallelize **ANUGA**, an open-source hydrodynamic modeling software, by profiling and running time analysis of the program on **Nvidia Nsight Systems**
- Identified hot spots of the program that required parallelization to increase performance

Academic Achievements

2025 **Ranked 1** in the ES specialization of Electrical Engineering based on academic performance
2024 Received the **Undergraduate Research Award** for the work on cache side channel attacks
2023 Designed a 2D Mapping System that ranked among the **top 3** projects out of 70+ projects.
2020 Achieved All India Rank **878** in **JEE Advanced 2020** out of 150,000 candidates.
2020 Secured **99.82 percentile** in **JEE Mains 2020** out of 1,100,000 candidates.

Technical Projects

2024 **tinyVTA: FPGA-based Accelerator for Neural Networks** *Guide: Prof. Sachin Patkar*
The detailed report can be found here *Course Project*
- Implemented an accelerator for floating point operations such as block **matrix-multiply-accumulate** and **activation function** of DNN inference to an **FPGA**
- Verified the correctness by testing against the **MNIST dataset** using a large, fully connected model on the **Xilinx ZCU104 FPGA** and observing consistent results across all 128 test examples

Technical Projects (continued)

2023 **A Review of Commercial Accelerator Architectures** *Guide: Mr. Sunil Shenoy*
The presentation can be found here *Sr. Vice President Emeritus, Intel*

- Explored literature by NVIDIA, Google, Intel, and Groq on **hardware accelerators** for applications in data center chips and cards and performed a comparative study on peak performance
- Inferred that developing application-specific hardware, implementing memory slicing, and having larger caches and faster interconnects were key for high-performance

2022-23 **RISC Processor Design** *Guide: Prof. Virendra Singh*
The code can be found here *Course Project*

- Developed a six-stage pipelined processor that achieved a peak performance of **1.94 cycle/instruction**, which included a forwarding and hazard unit to tackle pipelining hazards
- Expanded this to a 2-way fetch superscalar processor handling out-of-order execution

2023 **Hand Held 2D Mapping System** *Guide: Prof. Siddharth Tallur*
The report can be found here *Course Project*

- Created a robot that remotely yet accurately mapped its trajectory in a **2-dimensional plane**
- Utilized an **IMU** and a **rotary encoder** to obtain position readings, and a **Bluetooth module** for real-time transmission to a computer to plot the path traced against light intensity

2020-22 **Matsya, Autonomous Underwater Vehicle (AUV)** *Guide: Prof. Leena Vachhani*
AUV-IITB is a team of 40+ students working on the design and development of an AUV

- Deployed the sixth iteration of **Matsya**, an Autonomous Underwater Vehicle (AUV), capable of **self-navigation** and performing tasks as described by the International RoboSub competition
- Migrated the logic of the electrical stack to work on **STM32G4** from the ATmega328P, enabling higher **operation speeds** provided by the increased I/O ports and better-suited **ISA**

Mentorship

2023 - 24 **DAMP Mentor** *Student Mentorship Programme*

- Appointed as a mentor from a pool of 80+ applicants based on interviews and peer reviews. Mentored six sophomores on a one-to-one basis in their academic and co-curricular pursuits.

2023 **English Language Improvement Training TA** *Student Mentorship Programme*

- Assigned as an English Language Improvement Training one-on-one TA. Provided resources and held sessions that helped the students become more confident while speaking in public.

2022 **RnD Head** *AUV - IITB*

- Mentored a batch of recruits to AUV-IITB as the RnD head and helped train them. Provided resources and transferred knowledge regarding the functionality of the AUV.

Teaching

Teaching assistant at IIT Bombay for the following courses.

Year	Course	Instructor
2025	EE 309 Microprocessors	Prof. Rajababu V
2024	EE 709 Testing and Verification of VLSI Circuits (Head TA)	Prof. Madhav Desai
	EE 779 Advanced Topics in Signal Processing	Prof. Satish Mulleti
2023	MA 106 Linear Algebra (Head TA)	Prof. Jugal Verma
	MA 111 Integral Calculus	Prof. Preeti Raman
2022	MA 205 Complex Analysis	Prof. Saikat Mazumdar
	MA 207 Partial Differential Equations	Prof. Harsha Hutridurga