Akhil Raj Baranwal

Undergraduate in Electronics and Instrumentation Engineering

akhil.r.baranwal@gmail.com | arbaranwal | akhil-raj-baranwal

Work Experience

Micron Technology — *Hyderabad, India*

ASI Development Engineer — *Aug 2020 - Present*

- Worked on SoC verification of storage controllers and post-silicon bringup.

CFAED - Techinsche Universität Dresden — *Dresden, Germany*

Guest Researcher — *Jan 2020 - June 2020*

- Worked with the Chair for Processor Design, CFAED, on a UG thesis titled ”Exploiting FPGAs for reinforced learning based systems”

Micron Technology — *Bengaluru, India*

Embedded Engineer Intern — *May 2019 - July 2019*

- Worked on encrypted high speed memory-trace collection and analysis of DRAM AXI traffic under PetaLinux environments

Adani Power Maharashtra Limited — *Tirora, Maharashtra*

Summer Intern — *May 2018 - July 2018*

- Developed a rule-based artificially intelligent Human Machine Interface based on Android and GSM network for controlling several industrial pumps spread across an area of more than 1600 acres.

Automation and Robotics Club, BITS Pilani Hyderabad Campus — *Hyderabad, India*

Head — *April 2018 - April 2019*

- Conducted workshops on robotics, taught classes on computer architecture, and worked on developing and honing the students' skills in these fields.

Publications

ReLAccS: A Multi-level Approach to Accelerator Design for Reinforcement Learning on FPGA-based Systems — *October 2020*

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems — *DOI Hyperlink*

Development of Completely Automated Poly Potential Portable Potentiostat — *February 2021*

ECS Journal of Solid State Science and Technology — *DOI Hyperlink*

Education

Birla Institute of Technology and Science, Pilani — *Hyderabad, India*

Bachelor of Electronics and Instrumentation Engineering — *July 2016 to Present*

- **Technische Universität Dresden**, Saxony, Germany — *Semester Abroad 2020 (Jan - July)*

Delhi Public School Ghaziabad — *Ghaziabad, India*

AISSCE, 93.8% — *2013 to 2015*

St. Mary's Convent School — *Ghaziabad, India*

CISCE, 91.2% — *2004 to 2013*

Projects

Implementation of RISC-like processor with write-through cache controller

Course Project *Aug 2019 - Nov 2019*

- 32-bit, 4-stage pipelined processor with Fetch, Decode, multiple Execute, and Writeback stages
- Dynamic scheduling of instructions with Tomasulo's approach and LRU based write-through cache for data.

P^4 (Poly Potential Portable Potentiostat) *Closed-source*

Undergrad Research *Aug 2019 - Dec 2019*

- Worked with the MMNE group to build P^4, an approximate Poly-Potential Portable Potentiostat based on the LMP91000EVM to perform simple electrochemical analysis.
- P^4 supports common electroanalysis routines and reduces the cost of a typical spectro-photometer by about 15-20 times.

ECSP *Closed-source*

Undergrad Research *Jan 2019 - Apr 2019*

- Worked with the MMNE group to build ECSP, an intelligent colorimeter able to back-estimate the dominant absorption spectra of a solution with characteristic wavelengths in the visible light range.
- ECSP features a precision of 1 nm with a standard deviation of 2.3% and reduces the cost of a typical spectro-photometer by about 150 times.

Fault Tolerant Network on Chips *Open-source*

Undergrad Research *Aug 2018 – Dec 2018*

- Worked with Prof Soumya J to propose a new algorithm for fault-tolerant network on chips focusing on a packet-routing strategy for link faults between routers that occur either during manufacturing or in-operation. The algorithm decides the shortest path as well as takes care of distributing the load evenly across the network grid.
- Extended the algorithm for Mesh and Torus topologies for both, routers and link-level faults.

xBITS

Undergrad Research *Dec 2017 - Aug 2018*

- Worked under Dr. Suman Kapur to create a medical device that can diagnose UTI (Urinary Tract Infections) almost 15 times quicker than conventional laboratory methods.
- The device employs an array of colour sensors that predict the contents of the specimen according to RGB absorbance values and a trained model.

EasyMouse *Open-source*

Independent Project *Jan 2018 - Apr 2018*

- Gesture controlled pointing device emulator written in Python targeted towards users with disabled fingers.
- Wearable part based on ATMega328 can be worn around wrist, and data is transmitted wirelessly to the host device.

ardUPS *Open-source*

Independent Project *Mar 2018 - May 2018*

- Smart ATMega328 based CLI programmable UPS for Single Board Computer devices providing options like power throttling and sleep scheduling
- Selected for Unleash Invisible Intelligence contest by Hackster.io

VMS *Open-source*

Independent Project *May 2018 - July 2018*

- Python utility to sync multiple devices playing the same video using MQTT which syncs timestamps instead of video frames, offering significantly less network usage.

Extra Curriculars

Positions of Responsibility Member, Embedded electronics team @ Hyperloop India : 2018-2019
Member, On Board Computing @ Pixxel : 2018-2019

Art Music-composition
Film-Making
Sketching Portraits

Social Service National Service Scheme (NSS-BPHC) : 2016-2017

Languages English, Hindi