# PASINDU SANDIMA SENARATH

pasindusandima@gmail.com linkedin/pasindu-sandima
github/pasindu-sandima (+94)-77-5740319

## RESEARCH INTERESTS

I am interested in the field of computer architecture, mostly domain specific accelerators and energy efficient optimizations, cache and memory optimizations, hardware security and near memory computations.

## EDUCATION

**B.Sc. Engineering (Hons), University of Moratuwa, Sri Lanka** *2018 - 2022*
Major - Electronic and Telecommunication Engineering **GPA - 4.08/4.20**

**GCE Advanced Level, Royal College, Colombo** *2008 - 2016*
*Physical Science* *Island Rank - **31** z-Score - **2.64***

## RESEARCH EXPERIENCE

**RISC-V Vector Processors** *(Ongoing)*
Goal of this research is to design an energy efficient vector ALU which is capable of catering the RISC-V vector extension instructions. Developed and simulated a vector adder and a vector multiplier which re-utilizes same hardware for different element widths.
*Keywords : Vector Processing, Vector Lanes, SIMD Architectures, RISC-V ISA*

**Oversight** *(May 2021 - April 2022)*
Developed an end to end solution to control and monitor the energy usage of buildings that consists of two smart sockets, a AC controller and a learning based prediction model. Researched on using historical energy data to predict energy usage of the future. Achieved a MAPE of 16% for one day ahead forecasts using an attention based LSTM model.
*Keywords : Energy Montitoring, Deep Learning*

## WORK EXPERIENCE

**Electronics Engineer - Paraqum Technologies (SiFive Contractor)** *(Ongoing)*
Core IP verification team at SiFive TW.

- Verification tasks related to cache coherent bus protocol TileLink.

**Visiting Instructor - University of Moratuwa** *(July 2022 - Oct 2022)*
Department of Electronic and Telecommunication Engineering

- Teaching Assistant for EN3240 - Embedded Systems Engineering
- Assisting Laboratory Sessions for EN1094 - Laboratory Practices 1

**Software Engineer - WSO2 Lanka** *(May 2022 - Oct 2022)*
API Manager Product Team at WSO2 Sri Lanka.

- Integrating a dynamic correlation logging capabilities to the API Manager Product and the Micro Integrator Product
- Maintaining Bug Fixes related to the API Manager Product, Micro Integrator Product and the Integration Studio Product.

## PROJECTS

**RISC-V Processor Implementation** *(April 2022)*
Designed and Simulated a **6 stage pipeline processor** for RISC-V RV32I ISA using Chisel3. Integrated a **direct mapped cache**, managed pipeline hazards by using a 2-bit **branch predictor** and a data forwarding unit. *Keywords :* ***Pipelining, Chisel3, Verilator, RISC-V ISA***

**Serial Bus Design Project** *(Jan 2022)*
Designed a serial bus protocol which supports **burst communication** with **split transactions**. A ready valid interface was used to communicate between 2 master devices and 3 slave devices. Added an **UART bridge** to communicate with external devices and tested using a DE2-115 FPGA Board. *Keywords :* ***Serial Bus, Verilog, UART, Ready-Valid Interface***

**Code Compression Project** *(May 2021)*
Developed a C++ driver code to compress and decompress codes for embedded applications using **4-bit dictionary** based compression. Achieved a code compression ratio of **3:1**. *Keywords :* ***C++, Compression Algorithms***

**Matrix Multiplication Processor** *(Feb 2021)*
Designed a **custom ISA** and a **multi-core** processor to perform matrix multiplication. Implemented the design on DE2-115 FPGA board using Verilog. *Keywords :* ***SIMD processing, ModelSim***

**Robot Design for Competitions** *(July,Nov 2019)*
Designed Arduino based robots to complete tasks comprising of line following, coin releasing, wall maze solving, obstacle detection, colour detection & line maze solving. Designed PCBs using Altium.

**UART Transceiver Implementation on FPGA** *(June 2019)*
Designed and Realized using the DE0-Nano Development Board. Verified the design using simulations.

## PROFESSIONAL QUALIFICATIONS

**Advanced Diploma in Management Accounting** *(Nov 2019)*
*Chartered Institute of Management Accountants(CIMA)*

## OTHER QUALIFICATIONS

**DEV210x: Introduction to C++ & DEV210.2x: Intermediate C++** *(Mar 2020)*
*by Microsoft on edX*

**Mastering Microcontroller with Embedded Driver Development** *(July 2020)*
*Learn bare metal driver development systems using Embedded C:*
*Writing drivers for STM32 GPIO,I2C,SPI,USART from scratch*
*on Udemy*

## SKILLS

| | |
|---|---|
| **Languages** | C, C++, Java, Scala, Python, C++, MATLAB, Verilog, Chisel3 |
| **Tools** | Vivado, Quartus, Shell, Git, ModelSim, Verilator, VSCode, Arduino |

## AWARDS

**Finalist** - *Xbotix 2019* *(Dec 2019)*
**Finalist** - *Sri Lankan Robotics Challenge 2019* *(Nov 2019)*
**Finalist** - *Ranked* $26^{th}$ in MoraXtreme Programming Competition *(Oct 2019)*
**Finalist** - *RoboFest 2019 Micromouse Competition* *(Sep 2019)*
**Champions** - *Robot Design & Competition* *(Aug 2019)*
**National Prize Winner** - *Operational Case Study - CIMA* *(Feb 2018)*

## EXTRA-CURRICULAR

**President** - *OREPA Student Chapter* *(2020/21)*
**School Projects Director** - *OREPA Student Chapter* *(2019/20)*
**Matching Panelist** - *AIESEC Colombo South* *(2018/19)*
**IR Team Member** - *AIESEC Colombo South* *(2018/19)*
**Junior Prefect** - *Royal College, Colombo* *(2011)*