

Anam Farrukh

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RESEARCH INTERESTS

Drone Autopilot Software/Firmware, Real-time embedded systems, Mixed Criticality Schedulers, Hardware Software co-design and Computer Architecture

EDUCATION

PhD. in Computer Engineering

2016-Present

Boston University-College of Engineering, Boston, USA

Current research topic: Fly-OS: Rate - Adaptive Mixed Criticality Scheduler design and implementation in Cleanflight Autopilot for smart UAV

Research Advisor: Professor Richard West

Course Work: Introduction to OS, Computer Architecture, Advanced Digital Design in Verilog, Digital VLSI circuit Design

Masters of Science in Electrical Engineering (CGPA: 3.75/4.00)

2012- 2014

Lahore University of Management Sciences (LUMS), Lahore, Pakistan

Specialization: Electronics and Embedded Systems

Thesis title: A Configurable, Multi-Cycle Integer and Floating Point MIPS pipeline Simulation Tool for Educational Purposes

Thesis Advisor: Prof. Jahangir Ikram

Course Work: Embedded Systems, Computer Architecture, Digital Control Systems, Digital Signal Processing

Bachelor of Science in Electrical Engineering

2008 - 2012

Lahore University of Management Sciences (LUMS), Lahore, Pakistan

Senior Project: Design and Implementation of a Soft-core 5 Stage Pipelined MIPS Processor on an FPGA

Project Advisor: Prof. S, Masud. and Prof. A, Pasha.

PROFESSIONAL SERVICES

Boston University

2017 - Present

- **Graduate Teaching Fellow** for Operating Systems and Software Engineering
- **Reviewer** for 24th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2018)

Techlogix Pakistan (PVT) Ltd.

2015 - 2016

Software Engineer - Front-end web development

RentVM, Inc.

2014 - 2015

Cloud Solutions Engineer and Architect (Infrastructure Team)

Lahore University of Management Sciences (LUMS)

2014

Research Assistant- Prof. Nauman Zaffar- Electrical Engineering Department

Lahore University of Management Sciences (LUMS)

2010 - 2013

Undergraduate Teaching Assistant for Digital Logic Circuits, Electromechanical Systems and Introductory Electronics Lab

WORKSHOPS

Google's International Women's Day Summit

March,2018

Women In Research Lean-In 2017 organized by Facebook at Facebook HQ, Menlo Park, CA.

Feb,2017

CRA-Women Grad Cohort Workshop, Washington D.C.

April,2017

Lahore University of Management Sciences

2012 - 2013

Teaching the Teachers Workshops by Prof. A, Abidi. UCLA

PUBLICATIONS

Michel Kinsy, Shreeya Khadka, Mihailo Isakov and Anam Farrukh, "Secure Heterogeneous Multicore Architecture Design", Paper accepted for publication at IEEE International Symposium on Hardware Oriented Security and Trust, 2017 (HOST-2017) 2017

HONORS & AWARDS

Distinguished Computer Engineering PhD Fellowship – Year 1 2016-2017
Deans Honor list , MS graduate level 2014
100% Scholarship of merit at MS graduate level 2013-2014

RESEARCH & PROJECTS

- PhD Research Project: "Drone OS: An Adaptive Mixed Criticality Real-time Operating System for smart UAVs" – Design of smart UAVs that are able to autonomously reason about their environments by adapting flight control behaviors and mission objectives in real time, during flight. Design of an adaptive mixed criticality scheduler that's smartly manages different criticality tasks within the UAV system and manages the allocation of resources with changing system criticality levels.
 - Autopilot firmware: Cleanflight/Betaflight for UAV systems 2017 - Present
- System Programming (Bare metal kernel development, x86 assembly for bootloader, basic file system development, FIFO/RR scheduler, thread library function implementation, with custom linker scripts)
- Developed a keyboard driver for Linux kernel 2017
- Master's Thesis: "Extension of "Visual MIPS" an integer based MIPS educational, simulation tool to a fully configurable Floating Point processor in Visual Basic"
 - https://www.scribd.com/doc/291492240/A-Configurable-Multi-Cycle-Integer-And-Floating-Point-MIPS-Pipeline-Simulation-Tool-For-Educational-Purposes-Report-of-the-First-Release?secret_password=pZlBVnc6lWjxS5DgAWjQ 2013 - 2015
- A quad-core processor design, with shared banked data cache and private instruction caches connected through a custom designed network on chip. Implemented in Verilog. 2017
- Designed layouts and schematics of digital gates in Cadence 2016
- Sparse Matrix-Vector Multiplier implementation in Verilog. Reproducing results of a research paper on "High Memory Bandwidth FPGA Accelerator for Sparse Matrix-Vector Multiplication" by Fowers et. al. as part of a semester project 2016
- Developed the front end of Micro-Finance Application web portal on Angular JS as a Software Engineer at Techlogix, Pakistan 2015
- Magnetic Levitation System with a single electromagnet, IR Sensors and an analog PI controller 2014
- Undergraduate Senior Year Project: "Design and Implementation of a 5-stage Pipelined MIPS processor on a Xilinx FPGA"
 - Designed in VHDL and mapped onto a Xilinx Spartan 3E Nexys-2 FPGA board. Optimized the processor design with stall detection, forwarding logic and static branch prediction.
 - Complementary assembler design in C++ 2011-2012

RELEVANT SKILLS

- Languages:
 - C/C++, Bash Scripting, Visual Basic 6, VHDL, Verilog, MIPS & RISC-V Assembly, HTML5, CSS, JavaScript
- Platforms and IDEs:
 - Cleanflight/Betaflight autopilot firmware, Cadence, MATLAB, LT Spice IV, QTCreator, Electric (digital VLSI SoC design), Apache Cloudstack Cloud Orchestration Platform, Citrix XenServer, Citrix Netscaler, AngularJS, Xilinx FPGAs, MINI6410, PIC microcontrollers

REFERENCES

- Prof. Richard West (Professor, Dept. of Computer Science, BU, Boston, USA)
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Web: <https://www.cs.bu.edu/~richwest/>
- Prof. Michel Kinsy (Assistant Professor, Dept. of Electrical and Computer Engineering, BU, Boston, USA)
Tel: +1-617-353-0037 Email: mkinsy@bu.edu
Web: <http://ascslab.org/>
- Prof. Abubakr Muhammad (Associate Professor, Dept. of Electrical Engineering, SBASSE, LUMS, Lahore, Pakistan)
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