SUHAIL BASALAMA

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EDUCATION

University of Arkansas Fayetteville, AR
B.S. in Computer Engineering | Cumulative GPA: 4.0 Dec. 2019

University of Arkansas Fayetteville, AR
B.A. in Political Science | Cumulative GPA: 4.0 May 2020

RESEARCH INTERESTS

- Computer Architecture
- Machine Learning Acceleration
- Hardware/FPGA Acceleration
- VLSI Design and Methodology
- Algorithm/Hardware Co-design
- Heterogeneous Computing

RESEARCH EXPERIENCE

University of Arkansas | Computer Systems Design Laboratory Jan. 2019 – Current
Research Assistant | Dr. David Andrews
ARray Processor (ARP) Project: Four different SIMD systolic array processor architectures on the Xilinx Virtex-7 FPGA VC707 for machine learning acceleration (LSTM RNN).

- Built a MicroBlaze System-on-Chip (SoC) with external BRAM for the ARP instructions
- Wrote an Instruction Sequencer Module in Verilog and packaged it as an AXI4 IP core
- Designed, implemented, and packaged four parameterizable array processor systems, each made of:
  - Top-level Module, Interconnect, Controller, and Processing Elements (Serial/Parallel ALUs and Register Files)
- Devised an approach to map 16 1024-bit register files to RAMB18 vertically for efficient memory utilization
- Manipulated Booth's and Modified Booth's algorithms to reduce the shift operations (1.88X speedup)
- Analyzing and comparing the four systems in terms of performance, resource utilization, memory, and power
- Working on deploying an LSTM RNN Benchmark on our systems

University of Arkansas | Smart Embedded Systems Lab Jun. 2018 – Jan. 2019
Research Assistant | Dr. Christophe Bobda
ARLO Robot: An autonomous ground vehicle built using the Parallax Arlo Robot System and the Digilent Zybo Z7-20 FPGA.

- Built a Zynq-7000 SoC with UART IP and a custom Ultrasonic Sensor IP I implemented
- Deployed a Petalinux system on the SoC and configured the kernel with the needed modules
- Installed and configured the Robot Operating System (ROS) Kinetic Kame on the top of the Petalinux

Cryptocurrency Wallet: A hardware-based wallet with end-to-end AES encryption for cryptocurrency on the Lattice iCE40 Ultra Wearable Development Platform.

- Helped develop communication interface between the FPGAs and a smartphone using UART and Bluetooth LE
- Helped implement and package the AES encryption algorithm in Verilog on FPGA and in Python on the smartphone

TECHNICAL SKILLS

- **Languages:** Verilog, VHDL, C, C++, Python, Java, Xilinx Tcl, Bash, Assembly
- **CAD Tools:** Modelsim, Vivado HLx, Vivado HLS, Synopsys Design Vision, Quartus, Petalinux, ROS, Lattice Diamond
- **Design Skills:** System-on-Chip, IP Packaging, Static Timing Analysis, Algorithms, Finite State Machines, RTOS
- **Technologies:** FPGAs (Xilinx, Altera Intel, Lattice), Raspberry Pi, Arduino, Microprocessors, Microcontrollers, Sensors
- **Operating Systems:** Windows, Linux, macOS
- **Other Skills:** Git, SVN, LaTeX, Microsoft Office Suite

Teaching Experience

University of Arkansas | Digital Design CSCE 2113 Aug. 2019 – Current
Teaching Assistant | Dr. Patrick Parkerson

- Teaching 30 students in two lab sections the fundamentals of digital and hardware design including:
  - Number Representation, Combinational/Sequential Circuits, Optimizing Logic Functions, Flip-Flops, Registers, Counters, Lookup Tables, Hardware Description Languages (VHDL), Microcontrollers
- Holding office hours to assist students with the class or lab material
- Grading and correcting students' assignments, quizzes, lab reports, and exams

Chegg Inc. | Online Tutoring Aug. 2017 – Current
Computer Science Tutor | Part-Time

- Taught more than 30 students in various subjects, including C/C++, Java, and computer architecture
- It helps refresh my knowledge and exposes me to a wide variety of computer science problems

Relevant Coursework

- Core courses: Digital Design, Computer Organization, Operating Systems, System Synthesis and Modeling, Computer Architecture, Embedded Systems
- Elective courses: Algorithms, Artificial Intelligence, Machine Learning (CSCE 5063), Wearable and Ubiquitous Computing, Mobile Programming

Honors and Awards

2019 The Foundation for the International Exchange of Students Scholarship at UARK
2019 Dr. Henry M. Alexander Memorial Award
2019 Rosecrans, Sr Endowed Memorial Scholarship
2018 The Charles D. Brock Scholarship by the College of Engineering at UARK
2018 The Foundation for the International Exchange of Students Scholarship at UARK
2017 The John and Marie Lavallard International Scholarship at the University of Arkansas
2017 The University of Arkansas Transfer Student Scholarship
2014 The Silver Medal Representing Yemen in The Third Gulf Mathematics Olympiads in Oman
2013 The Top-Ten Student Ministerial Scholarship from the Yemeni government
2013 Ranked 9th among 218,964 Yemeni students in The National High-school Exams (>99.996%)

Publications

"ARP: ARray Processor Architectures for LSTM RNN Acceleration" In preparation

Standardized Tests

GRE | Quantitative: 166 (P_{89}), **Verbal**: 155 (P_{68}), **Analytical Writing**: 4 (P_{57}) Aug. 2019

References

Dr. David Andrews, Professor
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