Kalhan Koul

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Education

Bachelor of Science, Electrical Engineering, December 2018
Bachelor of Arts, Plan II Honors (Liberal Arts), December 2018
The University of Texas at Austin
Overall GPA: 3.98/4.00
GRE Score: Quantitative - 169/170, Verbal - 169/170, Writing - 5.5/6.0

Relevant Courses

Verification of Digital Systems (Graduate Course), Computer Architecture, Digital Systems Design (HDL) Lab, Digital Logic Design, Embedded Systems Lab, Honors Thesis, Solid-State Electronic Devices, Algorithms, Real-Time Digital Signal Processing Lab, Electronic Circuits Lab, C/C++ Software Design, Electromagnetic Engineering, Neuroscience (Plan II), Genetics (Plan II), Biology (Plan II), Doctor-Patient Relationship (Plan II), Philosophy (Plan II)

Work Experience

Lab Assistant in Nanoscale Characterization and Devices Laboratory, 7/15-Present
Advisor: Edward Yu, Judson S. Swearingen Regents Chair in Engineering

- Utilize a Raman spectrometer and atomic force microscope to study flexoelectric properties in semiconductor materials, specifically Transition metal dichalcogenides
- Created a MATLAB GUI that transports data from the Bruker software to MATLAB and analyzes the data to better understand the 2D material
- Contributed to poster presentation at the Material Research Society conference in Boston (Electromechanical Response of Single and Few Layer MoS_2 using Piezoresponse Force Microscopy, 2016)
- Contributed to poster presentation and attended the Physics and Chemistry of Surfaces and Interfaces conference in Hawaii (Out-of-Plane Electromechanical Response of TMDs, 2018)
- Instructed new graduate students on operation of atomic force microscope, and performed topological measurements for other students in the lab

Design Intern at Silicon Labs, 5/18-8/18

- Worked on a MATLAB model of the demodulator block of a radio transceiver
- Read design documents, RTL, and spoke with engineers to add OOK modulation functionality (including hardware and firmware optimizations) to the model
- Added appropriate demodulation filters and detection algorithms
- Suggested changes to RTL based on MATLAB model performance

Teaching Assistant at The University of Texas at Austin, 9/17-12/17

- Supervised lab sections for Introduction to Electrical Engineering
- Graded homework and provided feedback on assignments
- Taught students how to use LabView and the National Instruments myDAQ

Design Intern at Silicon Labs, 5/17-8/17

- Accelerated a MATLAB model of a 40nm radio transceiver using C-MEX code
- Created and gave a presentation describing effective MATLAB coding styles and how to use the model efficiently
- Automated testing system to check outputs of model utilizing Jenkins
- Worked on chip-level verification and debugged test cases which involved both a hardware and firmware understanding (SystemVerilog and C)

Embedded Systems Intern at Texas Instruments, 5/16-8/16

- Developed a Python API for the fuel gauge simulator that made it easier to simulate the lifetime of a battery for both customers and in-house engineers
- Wrote over 50 customer-inspired test cases to assess the API
- Produced deliverables for the new API and participated in code reviews

Web Intern at Harwar in Shenzhen, China, 5/15-7/15

- Created an English website using jQuery to market industrial drones to North American and European countries
- Contacted potential customers in the United States to discuss the novel features of Harwar's drone technology

Relevant Projects/Publication

Verification of Double-Precision Floating-Point Unit for Verification Course, 5/18

- Utilized UVM and System Verilog to verify calculations follow IEEE 754 guidelines for all floating point operations
- Used Formal Verification with JasperGold to verify timing of the processor and that the correct exceptions were taken appropriately

Entrepreneurship Project for Senior Design Course, 9/17-5/18
Advisor: Constantine Caramanis

- Developed a solution to drowsy driving-related accidents: IDA, the Intelligent Driving Assistant, consisting of a Raspberry Pi, IR Camera, and mobile application
- IDA detects drowsiness in the form of sleep incidents or yawning and relays that information to the user via Bluetooth
- Collaborated with team to write software for mobile app, Raspberry Pi, and performed business analysis, including a market survey and sales projection
- YouTube Link: https://www.youtube.com/watch?v=bD-kZ4DSRO4&t=13s

Verilog Model of RISC Microprocessor for Digital Systems Design Course, 11/17

- Gained familiarity with MIPS ISA
- Synthesized and implemented MIPS processor on Xilinx FPGA board
- Extended the MIPS ISA by adding new instructions for additional functionality

Peer-reviewed Journal Publication, 8/17

C. J. Brennan, R. Ghosh, **K. Koul**, S. K. Banerjee, N. Lu, and E. T. Yu, "Out-of-Plane Electromechanical Response of Monolayer Molybdenum Disulfide Measured by Piezoresponse Force Microscopy," *Nano Letters* 17 (9), 5464-5471 (2017).

Theremin & Tuner Project for Embedded Systems Course, 5/17

- Created a Theremin/Tuner using the TM4C123 LaunchPad and CC3100 BoosterPack
- Used motion sensors, buttons, a LCD display, a microphone, and a speaker to create a web-connected musical instrument

Skills

Most experienced in System Verilog, C/C++, MATLAB
Proficient in ARM Assembly, Java, Python, VHDL, LabView
Practiced in Web Design (HTML/CSS/Javascript/jQuery)

Achievements

2nd Place Senior Design Entrepreneurship Competition, 5/18
Recipient, Dr. Anson L. Clark Endowed Presidential Scholarship, 6/17
2nd Place Embedded Systems Design Competition, 5/17
Member of Eta Kappa Nu, 1/17
Recipient, Virginia and Ernest Cockrell, Jr. Scholarship in Engineering, 9/14