

Kartik V. Sastry

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Objective:

Pursue exciting opportunities in electrical and computer engineering and science with an emphasis on modeling, optimization, control systems, embedded systems, augmented reality and intelligent systems.

Education: Georgia Institute of Technology, Atlanta, GA

M.S. Electrical and Computer Engineering, December 2020

GPA: 4.0

Thesis: *Minimum-Time Control of the Damped Harmonic Oscillator via Multi-Mode PWM*

Advisor: Professor David G. Taylor

B.S. Computer Engineering *with Highest Honors*, December 2018

GPA: 4.0

Professional Experience:

Graduate Research Assistant, Georgia Tech School of ECE

January 2020 – Present

Short Distance Imaging and Tactile Sensing for Robotic Grippers

Sponsor: Texas Instruments

- Designed and developed embedded software to interface the PGA460 Ultrasonic Transducer Driver and Signal Processor to the Texas Instruments F28379D (C2000-Family) and MSP430 Microcontrollers to enable rapid data collection and experimentation.
- Designed digital control algorithms to shut down undesirable ringing that occurs after an ultrasonic transducer is excited. Studied and validated algorithms via detailed simulations accounting for actuator saturation, model parameter error, and various aspects of microcontroller influence including discrete-time control update, sensor/actuator quantization, and PWM hardware operation
- Designed and implemented multi-mode PWM, a novel method for realizing time-optimal control signals for second-order systems

Convergence of Electrified Vehicles and the Power Grid

Sponsor: Georgia Tech Strategic Energy Institute

- Investigating data-driven optimization methods for smart charging of electric vehicles (EV's). Present focus is on developing EV-owner-centric optimal charging schemes to maximize usage of renewable resources or minimize payments to an electric utility.

Graduate Teaching Assistant, Georgia Tech School of ECE

January – December 2019

ECE 4550: Control System Design: senior elective course that incorporates physics, mathematics, digital design, circuit theory, signals and systems, embedded systems and programming. Held weekly office hours to assist students with theoretical and lab aspects of the course. Co-supervised two weekly lab sessions focused on programming embedded systems to perform control-related tasks. Graded weekly homework. Delivered two lectures in the professor's absence. Recognized as the 2019 Outstanding Graduate Teaching Assistant for ECE.

Resident Advisor, Georgia Tech Department of Housing

August 2016 – May 2020

Ensured safety of residents during normal operation and emergency events. Supported resident needs, managed and resolved interpersonal conflicts, inspected facilities, organized and conducted activities to build a strong

community. Mentored younger students in the position. Counseled a new supervisor in my final year. Recognized as the 2018 Woodruff Student Staff Member of the Year.

Applied Research Intern, Georgia Tech Research Institute, ELSYS Laboratory.

May - August 2017

Designed, implemented and validated special-purpose precision delay circuit using VHDL and Xilinx Vivado Design Suite. Integrated this circuit as an I/O device with Microblaze processor IP and deployed the system on the Artix-7 FPGA. Developed firmware in C for a TCP host on the FPGA and a standalone GUI using C++ and Qt to enable users to change delay parameters in real-time. Documented design and prepared user-manual.

Undergraduate Teaching Assistant, Georgia Tech School of ECE

August - December 2017

Helped students of ECE 2031: Digital Design Laboratory to understand digital circuits, the design process, rapid prototyping, and FPGA-based design throughout the semester.

Undergraduate Intern, University of Akron

May - August 2016

Augmented a MATLAB codebase for particle tracking to record the location of nanoscale particles in viscous fluids and compute material properties. Conducted experiments to capture the Brownian motion of nanoscale particles in polymer solutions using high-speed video microscopy and characterize the polymer solutions.

Projects:

Capstone Design: Developed software (C++) to perform automated path planning for unmanned ground vehicles subject to mobility constraints. Processed noisy three-dimensional point cloud data describing approximately 500 square meters of terrain into a representative graph model. Employed the A* search algorithm to compute the shortest-distance path, subject to the mobility constraints of a ground vehicle. Served as the team leader, and contributed heavily to ideation, mathematical modelling, and software development. Sponsored by Harris Corporation, and advised by Prof. Erik Verriest.

Course Projects: Advanced Computer Architecture, Statistical Machine Learning, Fourier Techniques and Signal Analysis, Digital Image Processing, Power System Control and Operation, Introduction to Automation and Robotics, Data Analytics for Engineers, Control System Design, Embedded System Design, Architecture Concurrency and Energy in Computation, Digital Design Laboratory

Awards and Honors:

2019 Outstanding Graduate Teaching Assistant for ECE (Spring 2020), 2019 Herbert P. Haley Fellowship (Fall 2019), ECE Senior Scholar Award (Spring 2019), Faculty Honors (Spring 2016 - Fall 2018), Resident Advisor of the Year (Spring 2018)

Technical Skills:

Programming Languages: C, C++, MATLAB, Java, Python, MIPS Assembly Language, VHDL.

Hardware Platforms: Texas Instruments C2000-Family and MSP430 Microcontrollers, Xilinx Artrix-7 Series FPGA's, Altera Cyclone II FPGA, ARM mbed Microcontroller

Tools: Altera Quartus, Xilinx Vivado, AutoCAD, Autodesk Inventor, Texas Instruments Code Composer Studio

Extracurricular Activities:

IEEE, Eta Kappa Nu, Aarohi (Indian Classical Music)