MAKAI MANN

SUMMARY

I am a third year Electrical Engineering PhD student at Stanford University working with Dr. Clark Barrett on applying Satisfiability Modulo Theory (SMT) to formal verification of hardware systems. My interests also include optimization, signal processing and control systems.

EDUCATION

Electrical Engineering PhD Student	**Ongoing**
Stanford University	
MS in Electrical Engineering	**June 2018**
Stanford University	
BS in Systems Science and Engineering with second major in Computer Science	**May 2016**
Washington University in St. Louis, graduated Summa Cum Laude	

Academic Awards and Scholarships

Stanford EDGE --Enhancing Diversity in Graduate Education-- Fellow (awarded 2016)

Washington University Rodriguez Scholar (4 year scholarship program)

Washington University McLeod Scholar (4 year scholarship program)

Rick Grodsky Electrical & Systems Engineering Award for Technical Achievement (April 2016)
    for Senior Design Project: Machine Learning Approaches to Solar Output Forecasting

Electrical and Systems Engineering Outstanding Junior Award (April 2015)

Tau Beta Pi Record Scholar (awarded 2015)

Electrical and Systems Engineering Outstanding Sophomore Award (April 2014)

AISES Intel Scholar (awarded 2014)

Relevant Coursework

Introduction to Digital Logic and Computer Design,	Digital Signal Processing
Introduction to Formal Languages and Automata ,	Automated Reasoning
Topics in Computer Graphics: Agile Hardware Design,	Convex Optimization

EXPERIENCE

Intern – Apple Silicon Engineering Group Formal Verification Team   **Stanford, CA**
June 2018 – September 2018, September 2018 – March 2019 (part time)
Researching applications of SMT (Satisfiability Modulo Theory) solvers for formal verification of Apple hardware designs.

Intern – Apple Silicon Engineering Group Formal Verification Team   **Stanford, CA**
September 2017 – December 2017
Researching applications of SMT (Satisfiability Modulo Theory) solvers for formal verification of Apple hardware designs.

Research Assistant – Barrett Lab   **Stanford, CA**
January 2017 - present

Research various applications of SMT solvers to formal verification of hardware. I have written preprocessing passes and native (non-SWIG) Python bindings for the lab's solver, CVC4. I have taken over development for our model checker, CoSA, and written a generic SMT-LIB API in both Python and C++. Furthermore, I have used a variety of tools in the domain including Yosys, ABC, Boolector, Z3, CVC4 and CoSA to perform formal verification on various classes of hardware designs including arbitrated banks of FIFOs, CGRA (coarse grained reconfigurable architectures) processing elements, global controllers, and explicit memory management for linked lists in hardware.

Research Assistant – Agile Hardware Center   Stanford, CA
January 2017 - present

Applying SMT solvers to automate place-and-route for CGRAs. My primary role was building the routing portion of the tool using the graph-aware SMT solver, Monosat.

Ballistic Missile Defense System Integration Intern – MIT Lincoln Laboratory   Lexington, MA
June 2015-August 2015

Extended Kalman Filtering and multiple model state estimation algorithms development in Matlab.

Software Development Intern – Pacific Disaster Center   Maui, HI
June 2014-August 2014 (304 hours)

Developed an application to interpret and sort National Weather Service messages from a telnet stream and modified existing company code to process these messages to create "dots on a map."

Software Development Intern – Ardent Management Consulting   Maui, HI
June 2013-August 2013, January 2014 (270+ hours)

Helped design an internal web communication platform, using mostly HTML5 and some C#, JavaScript, JQuery and SQL.

Teaching Assistant – Matlab (CSE 200), Washington University   St. Louis, MO
January 2014-December 2015

Hold office hours for students, answer questions, grade assignments.

Grader – Signals and Systems (ESE 351), Washington University   St. Louis, MO
January 2015-May 2015

Grade quizzes, homework, tests and Matlab assignments.

COMPUTER SKILLS

Proficient in: Python, Matlab

Experienced in: CVC4, Z3, Boolector, Monosat, Yosys, JasperGold, C++

Have used: Haskell, JavaScript, PHP, Ant Builds, SQL, Git and Verilog

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LEADERSHIP

EDGE Fellowship Mentor, Stanford University   Stanford, CA
September 2018 - present

Serve as a point-of-contact and mentor for two new Electrical Engineering PhD students in the EDGE Fellowship program.

Treasurer – Tau Beta Pi Missouri Gamma Chapter, Washington University   St. Louis, MO
August 2015-May 2016

Coordinate with the national organization and manage the budget.