

Mark Santolucito

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Research Interests

Program Synthesis/Verification, Configuration Files, Data Mining, Reactive Programming, Computer Music

Education

Yale University

Computer Science Ph.D. - Advisor: Ruzica Piskac

New Haven, CT

2019 (Expected)

Yale University

Computer Science M.S. - Advisors: Paul Hudak†, Ruzica Piskac

New Haven, CT

2013–2015

Relevant Coursework: Software Analysis and Verification, Formal Semantics, Data Mining, Syntax Design, Compilers, Category Theory, Sound Synthesis

Amherst College

Computer Science B.A. & Music B.A., Cum Laude

Amherst, MA

2009–2013

Advisors: Scott Kaplan, Jason Robinson

Professional Experience

Amazon

SDE Intern - AWS Security Automation

New York, NY

Summer 2018

Applying my research on configuration file analysis to use machine learning to automatically build CloudFormation verification tools for code quality and security.

DecentraliNK

Research Project Leader

New Haven, CT

Spring 2018–

Leading a group of four undergraduates to build free-space optics (laser) based mesh network to deliver uncensored internet to North Korea. Awarded \$1000 from the Yale Entrepreneurship center to fund the project and participate in their accelerator program.

World Scholars, LLC

Co-Founder, CTO

New Haven, CT

Feb 2017–

Co-founded an international educational exchange that has hosted more than 75 students in 4 separate programs with a revenue of \$60,000 USD so far in 2018. Designed curriculum, taught lectures, and managed technical operations. www.worldscholars.global

Awards and Honors

Advanced Graduate Leadership Program

Yale University

2018–

A program designed to provide doctoral students with experience and training beyond the research lab. Also provides \$3000 to fund additional career development.

Rohan Fellow

Yale University

2017–2018

Graduate School funding support provided by the Theres and Dennis M. Rohan Fellowship Fund at Yale.

Heidelberg Laureate Forum

Young Researcher Award

Oct. 2017

An invitation and funding to attend the 5th HLF with Turing Award winners and Fields Medalists.

Student Research Competition

FMCAD

Oct. 2016

3rd Place Award for best student presentation

Carle Fellow

Yale University

2014–2015

Graduate School funding support provided by the Robert Willets Carle Scholarship Fund at Yale.

Travel Funding Awards

Summer schools: SSFT15, OPLSS2015, SAT/SMT2015, VTSA2017, ProbProg2017
Conferences: CAV2015/16/17, ICFP2015, POPL2016, FMCAD2016.

Best Undergraduate Thesis

Amherst College

May 2013

Awarded to the student who has written the best Computer Science thesis of the graduating class.

Lerner Piano Prize

Amherst College

May 2013

Awarded to the student who has achieved an exceptional level of ability and expressivity in the musical arts.

Copeland Commission

Amherst College

March 2013

Collaborating with Prof. of Music Stephanie Robinson, to create a motion tracking sound-art installation for "Art in the Place of Art".

Pease Research Fellowship

Amherst College

Fall 2012

In recognition and support of research in Representations of Media and Media Technology.

Dean of Faculty Funding

Amherst College

June 2012

Grant for undergraduate thesis research in Media Technology.

Teaching Experience

Geumgang University

Nonsan, South Korea

Visiting Faculty

Feb 2016–Aug 2016

Worked with other faculty and administration to design four-year curriculum map for new Computer Science major at the university and taught three courses of my own design in a mix of Korean and English.

CS101 - Intro to CS

CS201 - Intro to Object Oriented Programming

CS032 - Computer Music

Advising Student Projects

Vivek Goplan, Summer Research '18 - Synthesizing SDNs as Functional Reactive Programs

Ryan Lim, BS Thesis '18 - Protecting Strong Anonymity in Mesh Networks

Kate Rogers, BS Thesis '18 - Synthesizing DSP Filters on Non-Commutative Sound Samples [1]

Drew Goldman, High School Project '18 - On the Usability of Programming-By-Example for Scripting Tasks [2]

Halley Young, REU Student Summer '17 - Musical Refinement Types

Aeden Lombardo, REU Student Summer '17 - Synthesizing Music Synthesis [1]

Haohong Xu, BS Thesis '17 - Optimization of Synthesized Functional Reactive Programs

Aaron Shim, BS Thesis '16 - Towards Error-Free Configuration Files: A Learning Based Approach [4]

Marvin Qian, BS Thesis '15 - Representative Example Generation for Cooperative Programming

Yale University

New Haven, CT

Teaching Fellow

CPSC431 - Algorithmic Computer Music - Fall 2019

CPSC432 - Computer Music Sound Synthesis - Spring 2018

CPSC134/MUSI372 - Programming Musical Applications - Fall 2015

CPSC431 - Algorithmic and Heuristic Composition - Spring 2015

CPSC112 - Intro to Android App Development - Fall 2014

Amherst College

Amherst, MA

Teaching Assistant

Fall 2011–Spring 2013

Lead TA for CS study center, CS111, CS112

Invited Talks

Verification and Synthesis for Software Evolution at ETAPS, Greece

Apr 2018

Learning Models of Configuration Correctness.

IBM PL Day, NY, USA

Dec 2017

Synthesizing Functional Reactive Programming.

Instituto Superior Técnico (IST), Portugal

May 2017

Language Learning for Verification of Configuration Files.

Saarland University, Germany

Sept 2016

Service

Publicity Chair

FARM 2017, FARM 2016

Program Committee

ML4PL 2018, FARM 2016

Subreviewer

SMT 2017, ESOP 2017, ICDCIT 2016, VSTTE 2015

Organizer

CAV 2017 Buddy System, CAV 2016 Buddy System, CAV 2015 Buddy System

Yale CS Social Leader

Organize the weekly CS socials in the department 2015-2017

Publications (📖 indicates published proceedings, ↓_z^A indicates alphabetic author ordering)

[1] 📖 **Programming-by-example for audio: Synthesizing digital signal processing programs.**

Mark Santolucito, Kate Rogers, Aedan Lombardo, and Ruzica Piskac.

In Function Art and Music (FARM) at ICFP, 2018.

[2] 📖 **Programming by example: efficient, but not “helpful”.**

Mark Santolucito, Drew Goldman, Allyson Weseley, and Ruzica Piskac.

In Evaluation and Usability of Programming Languages and Tools (PLATEAU) at OOPSLA (to appear), 2018.

Also presented at SYNT 2018.

[3] ↓_z^A **Synthesizing functional reactive programs.**

Bernd Finkbeiner, Felix Klein, Ruzica Piskac, and Mark Santolucito.

2018.

Under Submission.

[4] 📖 **Synthesizing configuration file specifications with association rule learning.**

Mark Santolucito, Ennan Zhai, Rahul Dhodapkar, Aaron Shim, and Ruzica Piskac.

Proc. ACM Program. Lang., 1(OOPSLA), October 2017.

[5] 📖 🏆 **Version space learning for verification on temporal differentials.**

Mark Santolucito.

In Doctoral Symposium at ISSTA, 2017.

Also presented as poster at FMCAD 2016 Student Research Competition, 3rd Place Award.

[6] 📖 ↓_z^A **Vehicle platooning simulations with functional reactive programming.**

Bernd Finkbeiner, Felix Klein, Ruzica Piskac, and Mark Santolucito.

In Safe Control of Autonomous Vehicles Workshop at CPSWeek, 2017.

[7] 📖 **Probabilistic automated language learning for configuration files.**

Mark Santolucito, Ennan Zhai, and Ruzica Piskac.

In International Conference on Computer Aided Verification (CAV), 2016.

[8] 📖 **Media Modules: Intermedia Systems in a Pure Functional Paradigm.**

Mark Santolucito, Donya Quick, and Paul Hudak.

In International Computer Music Conference (ICMC), 2015.

[9] **Using javascript as an intermediate language for FRP.**

Mark Santolucito and Ruzica Piskac.

2015.

Poster at ICFP Student Research Competition.

[10]  $\downarrow \frac{A}{Z}$ **Real-time interactive music in haskell.**

Paul Hudak, Donya Quick, *Mark Santolucito*, and Daniel Winograd-Cort.

In *Functional Art and Music (FARM) at ICFP*, 2015.

[11] **Communalizing the interfaces of single player games.**

Mark Santolucito and Maria Hwang.

2014.

Extended abstract in Digital Games Research Association Conference.

[12]  **Raid the fridge!: Promoting healthy eating habits through the game Monster Appetitie.**

Maria Hwang, Pantiphar Chantes, and *Mark Santolucito*.

2014.

Extended Abstract and Poster at Games Learning and Society 10, Best in Show Award.

[13] **Simquabbin project: Game-based environmental science education in a virtual world.**

Mark Santolucito and Scott Payne.

2013.

Extended Abstract and Poster at Games Learning and Society 9.

[14]  **Designing a community to support long-term interest in programming for middle school children.**

Kyle J. Harms, Jordana H. Kerr, Michelle Ichinco, *Mark Santolucito*, Alexis Chuck, Terian Koscik, Mary Chou, and Caitlin L. Kelleher.

In *Proceedings of the 11th International Conference on Interaction Design and Children*, IDC '12, New York, NY, USA, 2012. ACM.