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Jean Yang

Research Interests

Programming language design, software verification, and security applied to security, privacy, and biological modeling.

Education

2010–2015 **Ph.D. computer science**, *Massachusetts Institute of Technology*, Cambridge, MA, USA.
Advisor: Armando Solar-Lezama. Thesis: "A Framework for Automatically Enforcing Information Flow Policies."

2008–2010 **M.S. computer science**, *Massachusetts Institute of Technology*, Cambridge, MA, USA.
Advisor: Armando Solar-Lezama. Thesis: "Specification-Enhanced Programming."

2004–2008 **A.B. computer science**, *Harvard University*, Cambridge, MA, USA.
Graduated *Magna Cum Laude*. Senior thesis advised by Greg Morrisett.

Research Experience

2015-present **Assistant Professor (Adjunct)**, *Carnegie Mellon University*, Pittsburgh, PA.
Accepted and deferred faculty position for one year.

2015-present **Postdoctoral Researcher**, *Harvard Medical School*, Cambridge, MA.
Developing program verification and analysis techniques to aid in the construction of rule-based, graphical kinetic models for protein interactions.

2009-2015 **Research Assistant**, *Massachusetts Institute of Technology*, Cambridge, MA.
Graduate research.

Summer 2010 **Research Intern, Programming Languages and Analysis Group**, *Microsoft Research*, Redmond, WA.
Worked with Nikhil Swamy and Juan Chen on extending a security-typed language, to support secure marshalling and cryptographic proofs.

Summer 2009 **Research Intern, Operating Systems Group**, *Microsoft Research*, Redmond, WA.
Worked with Chris Hawblitzel to build an operating system kernel verified for type-safety.

Summer 2006 **Research Intern**, *Computational Biology Initiative, Harvard Medical School*, Boston, MA.
Worked with Dennis Wall and Leon Peshkin to develop and implement computational processes for tracing evolution and coevolution of presynaptic receptors.

Industry Experience

Summer 2012 **Software Engineering Intern**, *Facebook, Inc.*, Menlo Park, CA.
Built verifier for backend privacy language. Filed patent.

Summer 2008 **Software Engineering Intern**, *Peerium, Inc.*, Cambridge, MA.
Worked at start-up creating a dependently typed functional language written in Haskell. Created parser for core language; wrote compiler optimizations; worked on GUI libraries.

Summer 2007 **Software Engineering Intern**, *Google, Inc.*, Santa Monica, CA.
Completed standalone project on video search team using C++. Received full-time offer.

Summer 2005 **Software Development Intern**, *Mellon Financial*, Pittsburgh, PA.
Worked on data mapping and management project using SQL and ColdFusion.

Awards and Honors

- **Levine Fellowship**, 2014-2015.
- **Gigam 10 for 2013 Cloud Trailblazers**, 2013.
- **Facebook Fellowship**, 2012-2013.
- **Best Paper Award**, Programming Language Design and Implementation (PLDI), 2009.
- **National Science Foundation Graduate Research Fellowship**, 2008-2011.
- Member, **Phi Beta Kappa** honor society, inducted May 2008.

Publications

JFP 2013 Nikhil Swamy, Juan Chen, Cédric Fournet, Pierre-Yves Strub, Karthikeyan Bhargavan, and **Jean Yang**. Secure Distributed Programming with Value-Dependent Types. *Journal of Functional Programming 23(4)*, July 2013.

PLAS 2013 Thomas H. Austin, **Jean Yang**, Cormac Flanagan, and Armando Solar-Lezama. Faceted Execution of Policy-Agnostic Programs. *Programming Languages and Security*, 2013.

POPL 2012 **Jean Yang**, Kuat Yessenov, and Armando Solar-Lezama. A Language for Automatically Enforcing Privacy Policies. *Principles of Programming Languages*, 2012.

CACM 2011 **Jean Yang** and Chris Hawblitzel. Safe to the Last Instruction: Automated Verification of a Type-Safe Operating System. *Communications of the Association for Computing Machinery*, December 2011.

ICFP 2011 Nikhil Swamy, Juan Chen, Cédric Fournet, Pierre-Yves Strub, Karthikeyan Bharagavan, and **Jean Yang**. Secure Distributed Programming with Value-Dependent Types. *International Conference on Functional Programming*, 2011.

PLDI 2010 **Jean Yang** and Chris Hawblitzel. Safe to the Last Instruction: Automated Verification of a Type-Safe Operating System. *Programming Languages Design and Implementation*, 2010. **Best Paper Award.**

Research Talks

Preventing Information Leaks with Jeeves

- Columbia University (Special Seminar, February 2015)
- University of California, Berkeley (Special Seminar, March 2015)
- University of Illinois, Urbana-Champaign (Special Seminar, April 2015)
- Carnegie Mellon University (Special Seminar, April 2015)
- Microsoft Research Redmond (April 2015)
- Samsung Research (April 2015)

Jeeves: A Language for Automatically Enforcing Privacy Policies

- Cornell University (August 2014)
- Columbia University (May 2014)
- Microsoft Research - Cambridge (October 2013)
- Gigaom Structure Conference (June 2013)
- Tufts University (Colloquium, December 2012)
- Brown University (June 2012)
- University of California, Berkeley (April 2012)
- Google - Mountain View (April 2012)
- Facebook - Menlo Park (March 2012)
- Northeastern University (December 2011)
- Harvard University (December 2011)
- Google - New York (July 2011)
- New York University (April 2011)

Teaching

November 2014 **Resident**, *Hacker School*.
Spent one week working with students at a free, full-time, immersive school for those seeking to be better programmers. Gave talks; worked with students interested in functional programming and software verification.

Fall 2012 **Recitation Instructor, Elements of Software Construction**, *Massachusetts Institute of Technology*.
Designed and taught mini-curriculum for introducing Scala to undergraduate students in course teaching concepts using Java and Python.

Fall 2010 **Teaching Assistant, Foundations of Program Analysis**, *Massachusetts Institute of Technology*.
Designed and graded assignments and held recitations for graduate-level program analysis course.

January 2010 **Instructor, C Memory Management and C++ Object-Oriented Programming**, *Massachusetts Institute of Technology*.
Designed and co-taught a for-credit Independent Activities Period (IAP) course for over 100 undergraduates. Prepared lectures and assignments; managed multiple graders; published materials on MIT's Open Courseware.

January 2010 **Instructor, So You've Always Wanted to Learn Haskell?**, *Massachusetts Institute of Technology*.
Designed and co-taught an Independent Activities Period (IAP) course introducing the Haskell language and its applications.

Spring 2008 **Teaching Fellow, Principles of Programming Languages**, *Harvard University*.
Helped with new course introducing programming languages concepts using the Coq proof assistant. Effectiveness rating 4.6/5.0. Received Certificate of Distinction in Teaching.

Spring 2007 **Teaching Fellow, Introduction to Computer Science II**, *Harvard University*.
Responsible for problem sets, exams, section, and office hours for course using Scheme and C++. Effectiveness rating 4.6/5.0; nominated for Undergraduate Council's Levenson Teaching Prize.

Fall 2006 **Teaching Fellow, Introduction to Formal Systems**, *Harvard University*.
Responsible for problem sets, exams, section, and office hours for course on computational models and complexity. Effectiveness rating 4.2/5.0. Nominated for departmental teaching award.

Fall 2005 **Course Assistant, Introduction to Calculus**, *Harvard University*.
Graded problem sets and ran weekly problem session. Effectiveness rating rating 4.4/5.0.

Mentoring

Students Supervised

- Patrick Long (MIT PRIMES Program, 2011-2012)
- Jesse Klimov (MIT PRIMES Program, 2011-2012)
- Amadu Durham (MIT UROP, spring 2012)
- Benjamin Shaibu (MIT UROP, spring 2012-spring 2013)
- Ariel Jacobs (MIT UROP, spring 2013-summer 2013)
- Travis Hance (MIT M.Eng. thesis, 2014)
- Chelsea Voss (MIT M.Eng. thesis, 2016)

Career Mentoring

2011-2012 Served as graduate mentor for undergraduate women in the Society of Women Engineers (SWE) Mentoring Program.

Service and Leadership

Conference service

- Co-Chair, Principles of Programming Languages Artifact Evaluation Committee (POPL AEC), 2017.
- Program Committee member, Principles of Programming Languages Student REsearch Competition (POPL SRC), 2016.
- Program Committee member, IEEE Symposium on Security and Privacy (Oakland), 2016.
- Program Committeee member, Programming Language Design and Implementation Program Committee (PLDI), 2016.
- Program Committee member, Principles of Programming Languages Artifact Evaluation Committee (POPL AEC), 2015.
- Program Committee member, ML Workshop, 2014.

Organizations founded

The Cybersecurity Factory. Started accelerator for early-stage cybersecurity companies with the goal of turning more research ideas into startups. Partnered with venture firm Highland Capital to run pilot program summer 2015. Continued involvement for summer 2016.

MIT Programming Languages Seminar. Started a weekly forum for professors and students to present ideas related to programming languages. Ran seminar 2010-2011.

MIT Programming Languages and Software Engineering Offsite. Started annual day-long offsite retreat with the MIT research groups in Programming Languages, Software Engineering, and Human-Computer Interaction. Served on Planning Committee 2010 and 2011; advised planning for subsequent retreats.

Graduate Women at MIT. Co-founded institute-wide organization with 1,800 members (as of spring 2014), over 80 planning committee members, and a budget of over $20K. Developed constitution, raised funds, established campus collaborations, and recruited members.

Harvard College Engineering Society. Founding member 2005-2008; President 2006-2007. Started Harvard-MIT team competing in international autonomous robotic soccer competition. Raised tens of thousands of dollars; recruited dozens of members.

Student representative

MIT EECS Faculty Hiring Committee. Attended talks, interviewed faculty candidates, and provided feedback on candidates (spring 2013).

MIT EECS Visiting Committee. Selected to provide student perspective on department and student life to the Visiting Committee (2013, 2014).

Harvard Computer Science task force. Served on task force of professors and students to improve department life for graduate and undergraduate students (fall 2009).

Selected Public Speaking

- **On the Front Lines: New Risks and Knowledge**, panel at *AtlanticLIVE*'s "Cybersecurity Today" summit (October 2015).
- **Cybersecurity: How to Use What We Already Know**, keynote at PrivacySecurityRisk (October 2015).
- **A Brief History of Programming**, Geek Girl Dinner Boston (December 2014).
- **A Brief History of Programming**, Women's Coding Collective Boston (December 2014).
- **An Axiomatic Basis for Computer Programming**, Papers We Love NYC (November 2014).
- **Challenging Technical Privilege: How Race and Gender Matter**, MIT (October 2014).
- **Graduate School 101**, panel at Scientista Symposium, MIT (April 2013).
- **How I Got There**, panel at Women in Advanced Computing (WiAC) Summit, San Jose, CA (June 2013).

Selected Popular Articles

"The Real Software Security Problem is Us." Jean Yang, *MIT Technology Review*, June 22, 2015.

"C is Manly, Python is for 'n00bs': How False Stereotypes Turn Into Technical 'Truths."' Jean Yang and Ariel Rabkin, *Model View Culture*, January 20, 2014.

Selected Press

TechCrunch "Coding In The Cloud Era Demands A Structural Rethink To Bake In Securirity And Privacy." Natasha Lomas, *TechCrunch*, Sept. 27, 2015.

Wired "The Quest to Rescue Security Research from the Ivory Tower." Klint Finley, *Wired*, July 2, 2015.

Fortune "Cybersecurity Factory Nurtures Early-Stage Startups in a Tough Field." Barb Darrow, *Fortune*, June 26, 2015.

Boston Globe "MIT Students, Highland Capital, Partner to Launch Cybersecurity Factory." Janelle Nanos, *The Boston Globe*, March 31, 2015.

Fast CoExist "A Better Way To Protect Privacy? Take The Programmer Out Of The Equation." Jessica Leber, *Fast CoExist*, March 7, 2014.

Wired "Out in the Open: A New Programming Language With Built-In Privacy Protocols." Klint Finley, *Wired*, March 3, 2014.

Gigaom "Want to build privacy into your apps? Check out Jeeves, now available in Python." Barb Darrow, *Gigaom*, Feb. 11, 2014.

MIT Tech Review "New Programming Language Removes Human Error from Privacy Equation." MIT CSAIL, *MIT Technology Review*, Feb. 10, 2014.

Gigaom "Cloud Trailblazers: 10 for 2013. Mission Possible? Jean Yang." Barb Darrow, *Gigaom*, May 28, 2013.

New Scientist "What your online friends reveal about where you are." Jacob Aron, *New Scientist*, January 25, 2012.

Patents

Stephen C. Heise, Jean Yang, Dwayne Reeves, and Yiding Jia. Privacy verification tool. US20140282837 A1, filed March 15, 2013.

Chris Hawblitzel and Jean Yang. Automated verification of a type-safe operating system. US8341602 B2, filed February 27, 2010 and issued December 25, 2012.

Other Interests and Activities

I am deeply interested in science communication and outreach. From 2013-2015 I ran **NeuWrite Boston**, a collaborative working group of scientists and writers. I am honored to have a chapter written about me in Andi Diehn's children's book, *Technology: Cool Women Who Code*.

References

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