

# Katherine Ye

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**RESEARCH INTERESTS** Applying techniques for **programming language design** and domain-specific language design to invent declarative, principled, and interactive modes of **information visualization**.

**EDUCATION** **Ph.D. in Computer Science, Carnegie Mellon University**  
Co-advised by Keenan Crane (graphics) and Jonathan Aldrich (programming languages).

**A.B. in Computer Science, Princeton University (2012–2016)**  
Worked with Andrew W. Appel, Adam Chlipala, David Walker, and Matthew Green.

**HONORS** Computing Research Association (CRA) Outstanding Undergraduate Researcher Award 2016  
ARCS Foundation Fellowship 2016  
Google Anita Borg Scholarship (1 of 30 in North America) 2016  
Honorable mention, NSF Graduate Research Fellowship 2016

**PUBLICATIONS** **Verified correctness and security of mbedTLS HMAC-DRBG**  
**Katherine Ye**, Matthew Green, Naphat Sanguansin, Lennart Beringer, Adam Petcher, and Andrew W. Appel.  
In *ACM CCS '17* (18% acceptance rate).

**The end of history? Using a proof assistant to replace language design with library design**  
Adam Chlipala, Benjamin Delaware, Samuel Duchovni, Jason Gross, Clément Pit-Claudel, Sorawit Suriyakarn, Peng Wang and **Katherine Ye** (alphabetical).  
In *SNAPL (The Summit on Advances in Programming Languages) '17*.

**Verified correctness and security of OpenSSL HMAC**  
Lennart Beringer, Adam Petcher, **Katherine Ye**, and Andrew W. Appel.  
In *USENIX Security '15* (16% acceptance rate).

**OTHER REFEREED PUBLICATIONS** **Substance and Style: domain-specific languages for mathematical diagrams**  
Wode Ni\*, **Katherine Ye\***, Joshua Sunshine, Jonathan Aldrich, and Keenan Crane.  
In *DSLDI (Domain-Specific Language Design and Implementation) '17*.

**Designing extensible, domain-specific languages for mathematical diagrams**  
**Katherine Ye**, Keenan Crane, Jonathan Aldrich, and Joshua Sunshine.  
In *OBT (Off the Beaten Track) '17*.

**EXPERIENCE** **Software Engineering Intern** Summer 2017  
*Google Brain, Distill team*

- ◊ *Distill* is a journal of machine learning that is dedicated to presenting clear, visual explanations of research in a modern medium. <https://distill.pub/about/>
- ◊ I designed and built novel interactive visualizations for an upcoming *Distill* publication on optimization in deep learning. This article was written in collaboration with a professor at the University at Toronto and three research scientists at Google Brain.

**Research Assistant** Summer 2016  
*Princeton University*

- ◊ Worked with Andrew Appel and Matthew Green on proving the security of HMAC-DRBG.

**Research Assistant** Summer 2015  
*MIT CSAIL*

- ◊ Worked with Adam Chlipala on a domain-specific language for program synthesis.

<b>EXPERIENCE</b>	<b>Software Engineering Intern</b> <i>Facebook, Search team</i> ◊ Visualized pairwise correlations between features in Facebook’s machine learning models.	Summer 2014
	<b>Programmer/Participant</b> <i>The Recurse Center (A three-month, full-time “writers’ retreat for programmers”)</i>	Summer 2013
<b>TALKS</b>	<b>PROCESS: finding desire paths in creative interfaces</b> Experimental talk given at Y Conf, a conference hosted by Y Combinator Research.	2017
	<b>Proof assistants as a tool for thought</b> Invited talk given at the Tools for Thought workshop, hosted by the Recurse Center.	2016
	<b>Strange loops: powerful knot notations</b> Talk given at Strange Loop, an industry conference, on insights in Conway’s knot notation.	2015
	<b>Proofs about programs, proofs as programs, programs as proofs!</b> Lightning talk given at !!con on proving code “equal” in Coq.	2015
<b>SERVICE</b>	Graduate Student Assembly, CS Department Representative	2017
	CMU REU Program in Software Engineering, Admissions Committee	2017
	SCS Dean’s PhD Student Advisory Council	2017
	Founder and co-president, Open Source at Princeton	2013–2015
<b>ADVISING</b>	Advising Nimo Ni, an undergraduate research intern, as part of a CMU REU program.	
<b>PRESS</b>	<b>Schneier on Security</b> , <i>Proof that HMAC-DRBG has no back doors</i> (2017) <b>Princeton.edu</b> , <i>Ambitious vision for computer science drives Princeton senior Ye’s research success</i> (2016)	