

# Joonwon Choi

PhD Candidate at MIT CSAIL

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## Research Interests

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Formal verification of hardware using the Coq proof assistant:

- ▶ Kami: a framework to implement, specify, prove, and synthesize hardware components based on modularity.
- ▶ Hemiola: a framework for structural design and proof of hierarchical cache-coherence protocols based on serializability.
- ▶ An end-to-end proof between hardware and software; I have worked particularly on the correctness proof of a pipelined RISC-V processor.

## Current Position

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PhD Candidate, MIT CSAIL

Sep 2014 – Feb 2021 (to graduate)

Advisors: Adam Chlipala and Arvind

## Education

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Massachusetts Institute of Technology

Sep 2016 – Feb 2021 (to graduate)

Doctor of Philosophy in Electrical Engineering and Computer Science

- Graduate Cumulative GPA: 5.0 (on a 5.0 scale)

Massachusetts Institute of Technology

Sep 2014 – Jun 2016

Master of Science in Electrical Engineering and Computer Science

- Graduate Cumulative GPA: 5.0 (on a 5.0 scale)

Seoul National University

Mar 2006 – Feb 2013

Bachelor of Science in Computer Science and Engineering

Double major in Mathematical Sciences

graduated with honors (summa cum laude)

## Publications

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- [1] Kami: A Platform for High-Level Parametric Hardware Specification and its Modular Verification.

**Joonwon Choi**, Muralidaran Vijayaraghavan, Benjamin Sherman, Adam Chlipala, Arvind.

Proceedings of the ACM SIGPLAN International Conference on Functional Programming (ICFP'17).

September 2017. [paper](#)

- [2] An Inlining Approach to Formal Hardware Semantics.

**Joonwon Choi**

M.S. Thesis in Electrical Engineering and Computer Science. Massachusetts Institute of Technology. [thesis](#)

Thesis Supervisor: Arvind

- [3] Crellvm: Verified Credible Compilation for LLVM.

Jecheon Kang, Yoonseung Kim, Youngju Song, Juneyoung Lee, Sanghoon Park, Mark Dongyeon Shin, Yonghyun Kim, Sungkeun Cho, **Joonwon Choi**, Chung-Kil Hur, and Kwangkeun Yi.

Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'18). June 2018. [paper](#)

- [4] EverCrypt: A Fast, Verified, Cross-Platform Cryptographic Provider.  
Jonathan Protzenko, Bryan Parno, Aymeric Fromherz, Chris Hawblitzel, Marina Polubelova, Karthikeyan Bhargavan, Benjamin Beurdouche, **Joonwon Choi**, Antoine Delignat-Lavaud, Cédric Fournet, Natalia Kulatova, Tahina Ramanananandro, Aseem Rastogi, Nikhil Swamy, Christoph M. Wintersteiger, and Santiago Zanella-Beguelin.  
IEEE Symposium on Security and Privacy (SP'20). May 2020. [paper](#)

## Drafts (under submission)

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- [1] Hemiola: A Framework for Structural Design and Proof of Cache-Coherence Protocols.  
**Joonwon Choi** and Adam Chlipala.
- [2] Integration Verification Across Software and Hardware for a Simple Embedded System.  
Andres Erbsen, Samuel Gruetter, **Joonwon Choi**, Clark Wood, Adam Chlipala.

## Honors & Awards

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Kwanjeong Educational Fellowship	Sep 2014 – May 2019
MIT Emerson Scholarship for Private Music Study	Sep 2014 – May 2018
Top Honor (summa cum laude) Certification Seoul National University	Feb 2013
Presidential Science Scholarship	Mar 2006 – Feb 2013

## Teaching Experience

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MIT 6.887: Formal Reasoning About Programs Teaching Assistant	Spring 2017
SNU 4190.310: Programming Languages Teaching Assistant	Fall 2013

## Working Experience

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Microsoft Research Cambridge, United Kingdom Research Intern	Jul 2018 – Sep 2018
ROSAEC, Korea Research Associate	Mar 2013 – Jul 2014
allm Games, Korea Software Engineer (Skilled Industry Personnel as alternative military service)	Apr 2009 – Oct 2011
Google, Korea Software Engineering Intern (SWE Intern)	Jan 2009 – Apr 2009
SK Communications, Korea Intern (Software Developer)	Jul 2007 – Aug 2007

Last updated: January 6, 2021  
<http://joonwon.net/c/docs/cv.pdf>