Peng Wang

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A hyperlinked version of this CV is available at https://people.csail.mit.edu/wangpeng/resume.pdf

Education

- **Massachusetts Institute of Technology**

  Department of Electrical Engineering and Computer Science

  Computer Science and Artificial Intelligence Laboratory (CSAIL)

  Doctor of Philosophy (PhD) in Computer Science

  8/2012 – 10/2018

  Thesis: Type System for Resource Bounds with Type-Preserving Compilation

  Advisor: Adam Chlipala

  Research Fields: Programming-Language Design and Implementation; Formal Software Verification; Compiler Verification

  Cumulative GPA: 5.0 out of 5.0

  Minors: Economics and Finance

- **Tsinghua University**

  Department of Computer Science and Technology

  Master of Science in Computer Science

  8/2010 – 07/2012

  Research Fields: Computer Vision; Machine Learning; Traffic-Sign Detection; General Object Detection

  Advisor: Bo Zhang, Fellow of Chinese Academy of Sciences

  Major GPA: 90.3 out of 100; Overall GPA: 90.1 out of 100

  Thesis: MedLSVM And Its Application To Structural Object Detection Models

- **Tsinghua University**

  Department of Computer Science and Technology

  Bachelor of Engineering in Computer Science

  8/2006 – 07/2010

  Major GPA: 92.5 out of 100, ranking 3 out of 137; Overall GPA: 92.1 out of 100, ranking 6 out of 137

Work Experience

- **Google Brain, Mountain View USA, Software Engineer**

  10/2018 – present

  I am a member of the TensorFlow team at Google Brain.

- **Microsoft Research, Redmond USA, Research Intern**

  05/2016 – 08/2016

  Mentors: Jonathan Protzenko and Nikhil Swamy

  I worked with the F* team (F* is a new programming language developed at Microsoft Research) and on the Everest Project. I proved the functional correctness and side-channel-attack resilience of a translation from Low* (a subset of F*) to C* (a subset of C).

- **Microsoft Research, Cambridge UK, Research Intern**

  06/2014 – 08/2014

  Mentor: Georges Gonthier

  I formalized the differential algebra and matrix differentiations in Coq, and wrote a tool that translates Coq proofs into LaTeX code for writing machine-learning papers.

- **Google, Beijing China, Research Intern**

  12/2010 – 05/2011

  Mentor: Edward Chang

  I designed and experimented with an unsupervised learning algorithm to learn a structural object representation from images.

PROJECTS

- **Projects at the Programming Language and Verification Group of MIT CSAIL**

  – Compositional Compiler Verification: I designed and verified a compiler from a C-like language (Cito) to an assembly language (Bedrock). The compiler supports linking compiled modules with modules generated by other compilers from other languages. The source language Cito is parameterized over user-defined abstract datatypes (ADT), so the user can implement ADTs in another language and use their abstract interface in Cito.

  – TiML: I designed and implemented TiML (Timed ML), a new functional programming language whose type system can specify and verify time complexities of programs at compile time.

  – TiEVM: I designed and implemented TiEVM (Timed EVM), a typed version of the Ethereum Virtual Machine (EVM) bytecode language with resource bounds for statically bounding gas consumption. I also developed a type-preserving compiler translating TiML programs to TiEVM ones, preserving resource bounds at the same time.

- **Projects at the Intelligent Image Laboratory of Tsinghua University**

  – Realtime Traffic-Sign Detection and Recognition: I designed and implemented the traffic-sign detection system for Tsinghua's self-driving-car team participating in China's first national autonomous-vehicle competition.

  – Bachelor Thesis: *Traffic-Sign Detection*

  – Master Thesis: *MedLSVM And Its Application To Structural Object Detection Models*. I designed the MedLSVM framework combining ideas from the Maximum Entropy Discriminative (MED) method and Latent-variable Support-Vector Machines (LSVM). I applied MedLSVM to object-detection tasks where the objects have deformable subparts.

PUBLICATION

- Peng Wang, Di Wang, Adam Chlipala. **TiML: A Functional Language for Practical Complexity Analysis with Invariants**. Proceedings of the 2017 ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2017).

- Jonathan Protzenko, Jean-Karim Zinzindohoué, Aseem Rastogi, Tahina Ramananandro, Peng Wang, Santiago Zanella-Béguelin, Antoine Delignat-Lavaud, Cătălin Hriţcu, Karthikeyan Bhargavan, Cédric Fournet, Nikhil Swamy. **Verified Low-Level Programming Embedded in F***. Proceedings of the 22nd ACM SIGPLAN International Conference on Functional Programming (ICFP 2017).

- Adam Chlipala, Benjamin Delaware, Samuel Duchovni, Jason Gross, Clément Pit-Claudel, Sorawit Suriyakarn, Peng Wang and Katherine Ye. **The End of History? Using a Proof Assistant to Replace Language Design with Library Design**. Proceedings of the 2nd Summit oN Advances in Programming Languages (SNAPL 2017).

- (Alphabetically) Karthikeyan Bhargavan, Barry Bond, Antoine Delignat-Lavaud, Cédric Fournet, Chris Hawblitzel, Cătălin Hriţcu, Samin Ishtiaq, Markulf Kohlweiss, Rustan Leino, Jay Lorch, Kenji Maillard, Jianyang Pang, Bryan Parno, Jonathan Protzenko, Tahina Ramananandro, Ashay Rane, Aseem Rastogi, Nikhil Swamy, Laure Thompson, Peng Wang, Santiago Zanella-Béguelin, and Jean-Karim Zinzindohoué. **Everest: Towards a Verified, Drop-in Replacement of HTTPS**. Proceedings of the 2nd Summit oN Advances in Programming Languages (SNAPL 2017).

- Peng Wang, Karthikeyan Bhargavan, Jean-Karim Zinzindohoué, Abhishek Anand, Cédric Fournet, Bryan Parno, Jonathan Protzenko, Aseem Rastogi, Nikhil Swamy. **Extracting from F* to C: a progress report**. ML Workshop 2016.

- Peng Wang, Santiago Cuellar, Adam Chlipala. **Compiler Verification Meets Cross-Language Linking via Data Abstraction**. Proceedings of the 2014 ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2014).

- Peng Wang, Jianmin Li, Bo Zhang. **A Real World Detection System: Combining Color, Shape and Appearance to Enable Real-time Road Sign Detection**. Proceedings of the 2012 International Conference on Computer Vision Theory and Applications (VISAPP 2012).

Professional Service

- POPL 2017, Artifact Evaluation Committee

Teaching

- MIT 6.887 Formal Reasoning About Programs, Spring 2016, Teaching Assistant

Fellowships & Awards

- Merrill Lynch Fellowship, 2012-2013

- Tsinghua-HuangRong Scholarship

- IBM-Tsinghua Scholarship

- First-Class National Scholarship, 2009

- First-Class National Scholarship, 2008

- National First Prize of National Olympiad in Informatics in Provinces (NOIP), 2005

- National First Prize of National Olympiad in Informatics in Provinces (NOIP), 2004