

Theophilos Giannakopoulos

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Professional Profile

Solution-oriented software engineer and researcher with extensive knowledge of logic and discrete mathematics, language design, and formal methods. Proficient at applying mathematical techniques and leadership experience to create high-quality deliverables.

Technical Skills

- › Haskell, Coq, C, Bash, C#, Java, SQL, Racket, Perl, C++, OCaml, Agda, HTML, CSS, JavaScript
- › Emacs, Vim, MS Visual Studio, Eclipse, git, SVN, LaTeX
- › Compiler construction, formal methods, probabilistic programming
- › Significant mathematical background:
 - › Applied logic, measure theory, abstract algebra, category theory, graph theory

Business Skills

- › Experience acting as Principal Investigator for DARPA projects
- › Experience leading remote teams
- › Experience authoring responses to DARPA BAAs
- › Experience with agile development
- › Experience with back office business processes in the financial industry
- › Experience integrating with domestic and international payment providers

Experience

BAE Systems

February 2014–Present

Principal Scientist

- › Software Engineering Lead for RINGS project for DARPA [BRASS program](#)
 - › Developing prototype software for automatic detection of and adaptation to changes in runtime environment and available system resources
 - › Managing collaboration with researchers at MIT and University of Pennsylvania
- › Principal Investigator for OP3 project for DARPA [PPAML program](#)
 - › Managed a team of five researchers, including professors at Northeastern University
 - › Developed semantics for probabilistic programming languages (see [publications](#) below)
 - › Implemented [a notebook IDE](#) for the [Gamble probabilistic programming language](#)
 - › Created [machine checked proofs](#) for [publications](#) on probabilistic programming semantics
- › Software Engineer for internal R&D project on applying SAFE architecture to RISC-V
 - › Developed security policy for and implemented demonstration of tagged architecture preventing [Heartbleed](#) attack on a system with a stock version of OpenSSL
- › Software Engineering Lead for [SAFE project](#) for DARPA [CRASH program](#)
 - › Maintained and extended a compiler for Tempest, a C-like programming language
 - › Designed and analyzed instruction set security policies on novel SAFE hardware
 - › Implemented operating system components for the SAFE system

Vistaprint

April 2012–January 2014

Senior Software Engineer

- › Collaborated with an international team to maintain a high availability payment system
- › Contributed to design and implementation for payment system overhaul
- › Maintained and improved legacy e-commerce payment system
- › Designed and created components for interacting with payment processors

Experience***Other experience***

- › Worcester Polytechnic Institute, Research Assistant 2008–2010, 2011–2012
 - › See [publications](#) below
- › Worcester Polytechnic Institute, Teaching Assistant 2008–2010, 2011–2012
- › Galatea Associates 2010–2011
 - › Created, maintained and provided support for back-office financial software
- › Milliman Global 2004–2007
 - › Developed insurance valuation system automation tools and quality assurance software

Publications**[Contextual Equivalence for a Probabilistic Language with Continuous Random Variables and Recursion](#)**

Wand, Giannakopoulos, Culpepper, and Cobb

Probabilistic Programming Semantics Workshop 2018 (PPS18)

Defined a logical relation for proving contextual equivalence in a probabilistic programming language with continuous random variables and recursion. The logical relation is useful for proving the correctness of compiler optimizations and other program transformations.

[Finite-depth HOAS trees for reasoning about probabilistic programs](#)

Giannakopoulos, Wand, and Cobb

Probabilistic Programming Semantics Workshop 2016 (PPS16)

Designed a core calculus for the purpose of investigating reasoning principles of probabilistic programming languages. The calculus captures the semantics of a stochastic language with observation while being agnostic to the details of its deterministic portions.

[Multi-Decision Policy and Policy Combinator Specifications](#)

Master's Thesis (Worcester Polytechnic Institute)

Designed semantics for a core language for policies and policy combinators, with a specific focus on multi-decision access control policies and the [Margrave policy language](#).

[Towards a Transition System Semantics for Alloy](#)

Giannakopoulos, Dougherty, Fisler, and Krishnamurthi

International Symposium on Formal Methods 2009 (FM09)

Developed an operational syntax and semantics for the Alloy software modeling language to repair ambiguities and ease the specification of transition systems over database instances.

This paper was based on my [Major Qualifying Project](#) at WPI.

Education***Worcester Polytechnic Institute***

- › M.S. Computer Science, May 2012, GPA 4.0
- › B.S. Computer Science, May 2009, GPA 4.0
 - › Minor in Mathematics
 - › Graduation with High Distinction