

Kenneth Knowles

Resume

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Education

- 2014 **Ph.D.**, *University of California, Santa Cruz.*
- 2008 **M.S.**, *University of California, Santa Cruz.*
- 2004 **B.S.**, *University of California, Berkeley.*

Professional Experience

- 2013 – present **Lead Engineer**, *ArborBridge.*
Responsible for software development outcomes, from strategy to execution and subsequent analysis. Leading a small, hand-picked team of senior engineers as well as overseeing engagements with usability analysts, designers, overseas resources, etc. ArborBridge delivers personalized educational services using proprietary curricula developed according to advances in technology, pedagogy, and neuroscience.
- 2013 **Senior Engineer**, *Dimagi.*
Led development of backend data export and transformation tools. In addition, contributed broadly to CommCare, a suite of cloud and mobile technology supporting diverse efforts to deliver basic food, health, and education to underserved communities worldwide.
- 2010 – 2012 **Platform Engineer**, *Inkling.*
Directed the analytics team, including business analysts, designers, front-end and back-end developers. In addition, played an instrumental role in the development of Inkling's platform for premium interactive learning content, including their REST API, devops pipeline, publishing tools, web store, and search capabilities.
- 2009 – 2010 **iPhone Application Engineer**, *Sugarcube.*
Developed iPhone apps for Fortune 500 brands, including Gap, Timberline, Target and Cooks Illustrated. Our apps were regularly featured in Apple commercials and stores.
- 2004 – 2009 **Research and Teaching Assistant**, *University of California, Santa Cruz.*
Developed executable refinement types, a new kind of undecidable type system that has the full expressive power of higher-order contracts. Demonstrated their formal semantics and explored how to perform type checking and type reconstruction, contributing new theory and implementation techniques for each, as well as novel architectural ideas for the compilation toolchain.
- 2000 – 2004 **Senior Programmer**, *Cityspan.*
Led the development team building Cityspan's principal product, Youthservices.net, an information management system now used by over 100 large not-for-profit clients such as the Chicago Public Schools. Conceived and created a language for nontechnical personnel to customize the product, an early AJAX-accelerated user interface, and a generalized query/reporting system.
- 2003 – 2004 **Research Assistant**, *University of California, Berkeley.*
Under professor Brian Harvey, added object-oriented features to the UC Berkeley Logo implementation. Under research director Adrian Freed of the Center for New Music and Audio Technologies, prototyped a C++/OpenGL interface for the Open Sound World visual programming language. Under graduate student researcher Ravi Kolluri, implemented and benchmarked heuristic optimizations to the *eigen crust* algorithm for reconstruction of solid models from 3-D laser scanner data.

Additional Training

- 2008 Summer School on Logic and Theorem Proving, *University of Oregon*
- 2007 Summer School on Language-Based Techniques for Integrating with the External World, *University of Oregon*
- 2006 Summer School on Language-Based Techniques for Concurrent and Distributed Systems, *University of Oregon*

Awards

- 2012 **Best Analysis**, *Hubway Data Visualization Challenge*.
With Kim Ducharme, Verena Tiefenbeck, and Zia Sobhani.
- 2004 – 2008 **Regents Fellowship**, *University of California*, Santa Cruz.
Fall 2004, Winter 2007, Spring 2007, and Fall 2008.
- 1999 – 2004 **National Merit Scholar**, *University of California*, Berkeley.
- 1999 **Radioshack/Tandy Scholar**, *San Ramon Valley High School*.
Awarded to top mathematics student in graduating class.

Refereed Publications

Hybrid type checking. Kenneth Knowles and Cormac Flanagan. *ACM Transactions on Programming Languages and Systems*, 32(2):6:1–6:34, February 2010.

Compositional reasoning and decidable checking for dependent contract types. Kenneth Knowles and Cormac Flanagan. In *Programming Languages Meets Program Verification*. ACM, 2009.

Proving correctness of a dynamic atomicity analysis in Coq. Caitlin Sadowski, Jaeheon Yi, Kenneth Knowles, and Cormac Flanagan. In *Workshop on Mechanizing Metatheory*, 2008.

Type reconstruction for general refinement types. Kenneth Knowles and Cormac Flanagan. In *European Symposium on Programming*. Springer-Verlag, 2007.

Sage: Hybrid checking for flexible specifications. Jessica Gronski, Kenneth Knowles, Aaron Tomb, Stephen N. Freund, and Cormac Flanagan. In *Scheme and Functional Programming*. ACM, 2006.

Trade Press

First Order Logic A La Carte. Kenneth Knowles. In *The Monad Reader*, issue 11. 2008.

Open Source

- Original author of [CommCare Export](#), an ETL and sync tool for CommCareHQ's REST API.
- [Django PRBAC](#), a Python+Django implementation of parameterized role-based access control.
- [OCaml FreeTDS](#), an OCaml binding to the FreeTDS C library for Sybase/MSSQL database connections.
- [puppetlabs/postgresql](#), a puppet library for deploying PostgreSQL instances.
- [Scala-RelaxNG](#), a core AST and parser for the Relax-NG schema language's compact syntax.
- [JSONPath-RW](#), an extended JSONPath implementation for Python.
- [Sage](#), a research prototype language blending executable refinement types with dynamic types.

Major contributions: [CommCareHQ](#), [CaseXML](#), [Couchforms](#)

Minor contributions: [ElasticSearch](#), [Tastypie](#), [Couchdbkit](#), [PLY](#), [Scalaz](#), [Roy](#), [Django Report Builder](#), [Claire](#)