Alessandro Warth

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Education:

- Ph.D. in Computer Science, 2009, UCLA. Advisors: Todd Millstein and Alan Kay. Dissertation title: *Experimenting with Programming Languages*. GPA: 3.950.

- M.S. in Computer Science, 2006, UCLA. Advisor: Todd Millstein. Thesis title: *LazyJ: Seamless Lazy Evaluation in Java*. GPA: 3.947.

- Dual B.S. in Computer Engineering and Computer Science, 2000, Univ. of Miami. GPA: 3.7. Graduated with honors.

Experience:

- *Software Engineer*, **Google, Inc.**, August 2011 to Present, Santa Monica, CA.

- *Computer Scientist*, **Viewpoints Research Institute**, June 2006 to Aug. 2011, Glendale, CA.

  Member of Turing award winner Alan Kay's research group, which is working on an NSF-funded project called Steps Toward the Reinvention of Programming (STEPS) – an attempt to implement "personal computing" in under 20k LOC. My research aimed to provide new, often domain-specific, programming language constructs that would help minimize the system's size and complexity. I designed and implemented OMeta, a programming language that enables rapid prototyping of new programming languages. (In less than 500 lines of OMeta code, I implemented a subset of JavaScript that was complete enough to run an early version of Sun's Lively Kernel project with decent performance!) OMeta has become a popular language implementation tool, and is currently being used in many projects outside VPRI. I also designed and implemented a new low-level language that supports garbage collection and dynamic compilation; the back-end of this language produces efficient 32- and 64-bit x86 code (joint work with Stephen Murrell).

- *Teaching Assistant*, **UCLA CS Dept.**, September 2005 to June 2006, Los Angeles, CA.

  Taught weekly discussion sessions for a Programming Languages course that introduced students to the functional, object-oriented, and relational paradigms. The languages discussed were OCaml, Scheme, Smalltalk, Java, Python, and Prolog.

- *Senior Software Engineer*, **Verid, Inc.**, August 2000 to October 2003, Sunrise, FL.

  Implemented *Transact-Secure*, a system that verifies the identity of consumers during online and MOTO transactions using data provided by credit bureaus like Equifax and Experian. The system was written in C and PHP (lots of CGI programming), used a MySQL database, and communicated with the credit bureaus using XML messages. Verid has since been acquired by RSA, and this product is now called RSA Identity Verification.

- *Undergraduate Researcher*, **Univ. of California, Berkeley**, June to August 1999, Berkeley, CA.

  Extended UCB's implementation of the Virtual Interface Architecture (VIA), which involved hacking on the Linux kernel and device drivers for high-performance networking hardware.

- *Intern*, **AT&T's RAPID Development Group**, June to August 1998, Alpharetta, GA.

  Enhanced AT&T's Restoration and Provisioning Integrated Design (RAPID) application, responsible for the self-healing properties of AT&T's network. Implemented an interface through which network engineers can monitor *virtual network links*, an important abstraction used by the routing algorithm. The work included writing C++ code for accessing persistent database objects through an Object Request Broker (ORB), and extending the system's GUI, which was written in Java, to provide access to this new functionality.

Skills:

- Programming language design and implementation (writing parsers, compilers, interpreters, garbage collectors, etc., formalizing language semantics and type systems, …),

- Java, C/C++, Smalltalk, Python, Haskell, OCaml, Scheme, JavaScript, ActionScript, Prolog, x86 Assembly Language, Shell Scripting, PHP, Perl, HTML, CGI, SQL, XML, XQuery, XSLT, Linux, FreeBSD, OS X, …

"For Fun" Projects:

- **Live Looping (Music) App.** I am currently working on a live-looping application that emulates (and in many ways, goes well beyond) the functionality of popular "loop pedals" such as the BOSS RC-50 Loop Station. I've already got a couple of working prototypes (one written in C and another in ActionScript) and I'm happy to demo them!

- **Search Engine.** A few years ago, I designed and implemented (in C++) my own multi-threaded web crawler and search engine. I used my own index file format instead of an off-the-shelf database system in order to optimize search performance. (I wasn't trying to compete with Google, just trying to get a better understanding of how this stuff works ☺)

- **Functional Language.** In the winter of 2001, Dr. Stephen Murrell and I implemented a functional programming language with lazy semantics and pattern matching similar to Haskell using an SECD machine. Our implementation, which was written in C, ran between 1.5 and 3 times faster than Hugs, a popular Haskell interpreter.

- **BCPL Compiler.** As an undergraduate, I wrote a BCPL compiler (in C) from scratch, i.e., without using tools like *lex* and *yacc*). I also wrote the accompanying Pentium assembler and linker/loader.

Publications: (all papers available for download at http://tinlizzie.org/~awarth)

- *Worlds: Controlling the Scope of Side Effects.* Alessandro Warth, Yoshiki Ohshima, Ted Kaehler, and Alan Kay. In the European Conference on Object-Oriented Programming (ECOOP), Jul. 2011.

- *Open, Expressive and Modular Predicate Dispatch for Java.* Todd Millstein, Christopher Frost, Jason Ryder, and Alessandro Warth. In Transactions on Programming Languages and Systems (TOPLAS), Feb. 2009.

- *Active Essays on the Web.* Alessandro Warth, Takashi Yamamiya, and Ted Kaehler. In the International Conference on Creating, Connecting, and Collaborating through Computing (C5), 2009.

- *Open, Reusable Object Models.* Ian Piumarta and Alessandro Warth. In the Workshop on Self-Sustaining Systems (S3), 2008.

- *Toward a More Scalable End-User Scripting Language.* Alessandro Warth, Takashi Yamamiya, Yoshiki Ohshima, and Scott Wallace. In the International Conference on Creating, Connecting, and Collaborating through Computing (C5), 2008.

- *Packrat Parsers Can Support Left Recursion.* Alessandro Warth, James R. Douglass, and Todd Millstein. In the Workshop on Partial Evaluation and Program Manipulation (PEPM), 2008.

- *OMeta: an Object-Oriented Language for Pattern-Matching.* Alessandro Warth and Ian Piumarta. In the Dynamic Languages Symposium (DLS), 2007.

- *LazyJ: Seamless Lazy Evaluation in Java.* Alessandro Warth. In the International Workshop on the Foundations and Developments of Object-Oriented Languages (FOOL/WOOD), 2007.

- *Statically Scoped Object Adaptation with Expanders.* Alessandro Warth, Milan Stanojevic, and Todd Millstein. In the International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA), 2006.

Invited Talks:

- *Much Ado About ⌘Z*, keynote at Smalltalks 2009, Buenos Aires, Argentina.

- *Implementing Programming Languages for Fun and Profit with OMeta*, keynote at Smalltalk Solutions 2008, Reno, Nevada.

- *Worlds: Controlling the Scope of Side Effects*, colloquium at the Tokyo Institute of Technology, 2008.

Patents:

- *Method of Authenticating a Payment Account User*, WO 02/067091 A3

- *Method for Simplifying and/or Securing Transactions over a Network*, WO 01/90994 A2

Honors:

- Member of the Tau Beta Pi, Eta Kappa Nu, Golden Key, and Phi Kappa Phi honor societies

- Awarded the U.S. Dept. of Education's GAANN Fellowship, 2004

- Honorable mention – NSF Graduate Research Fellowship, 2004

- Awarded the GEM Fellowship, 2004 (declined, accepted the GAANN Fellowship instead)

- 1999 Southeastern ACM Intercollegiate Programming Contest, 4th place

- Awarded the George E. Merrick, Ann Bacheller, and Florida Undergraduate Scholarships

- "Multiple offender" of the University of Miami's provost and dean's honor rolls

Languages:

- Fluent in Portuguese (native tongue), and able to communicate well in Spanish

References:

- Todd Millstein, professor, UCLA.
  Phone: (310) 825-5942
  E-mail: todd@cs.ucla.edu

- Alan Kay, Viewpoints Research Institute.
  Phone: (818) 332-3001
  E-mail: alan@vpri.org

- Stephen Murrell, professor, University of Miami.
  Phone: (305) 284-3422
  E-mail: stephen@rabbit.eng.miami.edu