

[File: ftp://swiss.csail.mit.edu/pub/users/ziggy/cv.txt]

Curriculum Vitae

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Department of Electrical Engineering and Computer Science
Massachusetts Institute of Technology
Cambridge, MA 02139 U.S.A.

Date of birth: January 1964 Citizenship: U.S.A.

Industry

- * Transmeta Corp. Software Development Engineer. [August 1998 to July 2002]
1 1/2 years - Performance & Efficiency Group - profiling tools [2001--2002]
2 1/2 years - Code Morphing System (CMS) - development engineer [1998--2001]

Academia

- * MIT Ph.D. Computer Science and Engineering [Expected 2007; ABD Feb 1993]
Thesis: ''Descartes: A Dynamically Adaptive Compiler and Run-Time System''
Minor: Computational Models of Learning & Machine Intelligence
* MIT S.M. Computer Science and Engineering [February 1990]
Thesis: ''FIX: The Design of an Efficient Kind/Type/Effect Checking System''
* MIT S.B. Computer Science and Electrical Engineering [June 1986]
Thesis: ''A Simulator for the L Architecture in Common Lisp''
Hum.C.: Cognitive Psychology
* High School: Gaffney Senior High School [June 1982]
Class valedictorian. Gaffney, South Carolina; U.S.A. 29340

Fields of Interest

- * Static & Dynamic Analysis and Optimization of Computer Programs
* Design and Implementation of Programming Systems
* Mathematical Logic (Lambda-Calculi, Semantics of Data Types)

Research Objectives

The development of powerful mechanisms for high performance execution of highly modular and abstract high-level programming systems for building large-scale, complex and sophisticated computing environments.

Research Experience

Doctoral Thesis [Expected completion: Jan or June 2007]

[Abstract: ftp://swiss.csail.mit.edu/pub/users/ziggy/Drafts/abstract.text]

My dissertation project weds a program performance profiler with a code
specializer (partial evaluator) and a run-time code generator to produce a
dynamically adaptive compiler and run-time system for MIT Scheme, a dialect
of Lisp.

Interesting aspects of the prototype implementation include: a PC-sample
based statistical code optimization focusing engine; ``spectral'' structural
type gathering; performance driven multi-specialization based on weighted
data distributions.

The proposal for this work in progress is listed in the ``Papers'' section.

Master's Thesis [February 1990]

My master's thesis at MIT involved the design of an efficient implementation
of the type checking phase of Professor Dave Gifford's FX-87 language [MIT
LCS-TR-407]. The FX-87 type expressions constitute a polymorphic typed
(kinded) functional lambda calculus with recursive types, structural
equivalence/inclusion of types, and static enforcement of anti-aliasing of
polymorphic values. FX-87's value expressions are based on Scheme, extended
to include explicit type declarations that declare the latent side-effects
of value-domain procedures with regard to the region of the store which they
affect as well as an ``implicit projection'' rule for inferring omitted
polymorphic projections.

The three primary findings of this work were: 1) recursive structural types
are strongly normalizing in polynomial time; 2) structural type equivalence
and inclusion testing are therefore efficiently computable using lazy
normalization; 3) ``implicit projection'' can be efficiently implemented
using ``abductive inference'' over the type equivalence and inclusion rules.

Two technical reports based on this thesis, as well as the thesis itself,
are listed in the ``Papers'' section below.

Other Projects

Software implementation experience has included: MIT SchMUSE, a Scheme-based
Multi-User Simulation Environment featuring a concurrent object-oriented
persistent heap; Clovers, a delegation-based OOPS extension to CLOS using
the CLOS MOP; SchemYCIN, an implementation of the expert system MYCIN in
Scheme, a dialect of Lisp; GEDIT, an interactive WYSIWYG graphics editor
with mixed text/graphics display (in C); an interactive semantic error
recovery system for Boris Katz's natural language parser (in MAC Lisp);
TRIVICALC, a minimalist spreadsheet engine (in CLU, an Ada-like language).

While an undergraduate at MIT, I was a principal architect of the ALU-based
microcoded portable computer which students built as a laboratory case study
in 6.004, the introductory undergraduate computer architecture course taught
by Professor Steve Ward. (Used for over a decade, it has recently been
supplanted by FPGAs and simulators.)

Teaching Experience

- * 6.001 Structure and Interpretation of Computer Programs (undergraduate intro) Graduate teaching assistant 5 terms, including 3 terms as Head TA [References: Professors Eric Grimson, Gerry Sussman and Peter Szolovits]
- * 6.004 Computation Structures (undergraduate computer architecture core) Graduate teaching assistant 2 terms; undergraduate head Lab Assistant 2 years [References: Professor Anant Agarwal and Professor Steve Ward]
- * 6.115 Microprocessor Project Lab (undergrad assembly language lab) - 1 term
- * 6.821 Theory of Programming Language Design (graduate core course) - 1 term

Graduate Classroom Experience

Adventures in Advanced Symbolic Computing. Advanced Program Analysis. Theory of Programming Language Design. Computer Systems Architecture. Dataflow and Graph Reduction Architectures. Contemporary Computer Design. Design and Analysis of Algorithms. Theory of Computation. Artificial Intelligence. Knowledge Based (''Expert'') Application Systems. Society of Mind. Computational Machine Learning. Law and Ethics on the Electronic Frontier.

Awards and Honors

- * Best Paper from the Student Presentation Contest at the Lisp Users and Vendors Conference (LUV'95) [See paper number 3 below]
 - * Tsar of the Unix Haters electronic mailing list (honorarium) [1994 to 1995]
 - * 1989 Carlton E. Tucker Award for Excellence in Graduate Teaching (EECS Dept.)
 - * Letters of academic commendation in computer architecture courses at both the undergraduate (6.004 Prof. Ward) and graduate (6.823 Prof. Arvind) levels
 - * Sigma Xi science and engineering honor society, associate member [lapsed]
 - * Timken Company Scholar: 4-year undergraduate scholarship [1982 to 1986]
 - * Chairman of the South Carolina State Governor's Youth Advisory Council [Sept. 1981 to June 1982] High School (Governor Richard W. Riley)
 - * South Carolina Governor's School at the College of Charleston [Summer 1981]
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Selected Papers -- [See <http://swiss.csail.mit.edu/~ziggy/papers.html>]

1. Descartes: A Dynamically Adaptive Compiler and Run-Time Execution System using Continual Profile-Driven On-Line Program Multi-Specialization
2. Improving Scheme Program Performance through Heuristic Redundant Predicate Elimination using PAC Learning Techniques
3. MIT SchMUSE: Class-Based Remote Delegation in a Capricious Distributed Environment by Michael R. Blair, Natalya Cohen, David M. LaMacchia, Brian K. Zuzga. Awarded ``Best Paper from the Student Presentation Contest'' 1995 Lisp Users and Vendors Conference, August 14--18, Cambridge, MA; U.S.A. Sponsored by the Association of Lisp Users (ALU). [Original conference paper also available.]
4. FIX: A Design for an Efficient Type/Region/Effect/Kind Checking System (Master's Thesis)
5. Fast Structural Type Equivalence and Inclusion Testing (Technical Report based on Master's thesis)
6. Raw, Pickled and Textured Static Side-Effect Analysis in FX-87 (Technical Report based on Master's research)

References

- Dr. Guillermo (Bill) Rozas gjr@alum.mit.edu [ref: Transmeta Corp.]
- Dr. Tom Knight, Jr. tk@csail.mit.edu (617) 253-7807 [sup: Ph.D.]
- Prof. Peter Szolovits...psz@csail.mit.edu... (617) 253-3476.. [ref: Ph.D.]
- Prof. Gerald J. Sussman gjs@csail.mit.edu (617) 253-5874 [ref: teach]
- Prof. Eric Grimson.....welg@csail.mit.edu... (617) 253-5346.. [ref: teach]
- Prof. Arvind arvind@csail.mit.edu (617) 253-6090 [ref: award]
- Prof. Steve Ward.....ward@csail.mit.edu... (617) 253-6036.. [ref: award]

Hobbies

Amateur Radio (Technician Class License: N1DZE), Squash, Jogging, Locksmithing
Chancellor of The M.I.T. Technology Hackers Association (T.H.A.) [1985--1987],
Alumn LaCrosse Wisconsin 'Blue Stars' Drum and Bugle Corps, 1980 (French Horn)

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