

Michael D. Adams

Present Address:

2001 E Lingelbach Ln./Apt. 325
Bloomington, IN 47408
+1-785-969-2431
adamsmd@indiana.edu
<http://www.cs.indiana.edu/~adamsmd/>

Permanent Address:

3626 SE Tomahawk Ct.
Topeka, KS 66605
+1-785-266-2778

Research Interests

Programming Languages, Compilation and Optimization, Static Analysis, Control-Flow Analysis, Type Systems, Dependent Types, Mechanized Logic, Program Verification

Education

Indiana University

*Doctor of Philosophy in Computer Science with a
Minor in Logic*
Advisor: R. Kent Dybvig
GPA: 3.90

Bloomington, Indiana

Expected Summer 2011

The University of Kansas

*Bachelor of Science in Computer Science and
Bachelor of Science in Computer Engineering with a
Minor in Mathematics*
GPA: 4.00

Lawrence, Kansas

May 2005

Professional Experience

Cadence Research (Dr. R. Kent Dybvig)

Independent Contractor

Bloomington, Indiana

May 2008 – August 2010

- Created a type recovery optimization for Chez Scheme based on control-flow analysis
- Helped update Chez Scheme to R6RS language standard
- Overhauled Chez I/O subsystem

Microsoft Research

Intern

Cambridge, England

April 2007 – June 2007

- Worked on Glasgow Haskell Compiler internals
- Added function call and procedure support to C-- language

IBM Research

Intern

Hawthorne, New York

January 2007 – March 2007

- Worked on X10 language
- Implemented ideas from Arcee in X10

Arcee Project (Dr. David S. Wise)

Graduate Research Assistant

Bloomington, Indiana

August 2005 – Present

- Designed techniques for faster linear algebra solvers which form the core of most simulations
- Doubled the speed of the existing research solver to be faster than other best of breed solvers
- Optimized the parallel-computing communication

JParse (Dr. Jerry James)*Software Engineer/Programmer***Lawrence, Kansas***June 2004 – April 2005*

- Maintained a Java parser for source transforms
- Refactored the system to be multiphase to allow transforms to be more modular

Honors Undergraduate Research (Dr. Perry Alexandar)*Undergraduate Research Assistant***Lawrence, Kansas***August 2003 – May 2004*

- Built a new embedded language for describing and checking design constraints

Veatros (Dr. John Gauch)*Software Engineer/Programmer***Lawrence, Kansas***May 2002 – May 2004*

- Developed software for television commercial detection on remote machines

Die Kueche Café*Independent Contractor***Paxico, Kansas***June 2000 – July 2000*

- Overhauled company web site

Western Resources*Independent Contractor***Topeka, Kansas***July 1998 – June 1999*

- Designed and implemented a web-based weather-image display and cataloging application

Teaching Experience**Indiana University***Associate Instructor***Bloomington, Indiana***January 2009 – Present*

- H212: Introduction to Software Systems, Honors: Spring 2011
- H211: Introduction to Computer Science, Honors: Fall 2010
- C343/A594: Data Structures: Fall 2009 and Spring 2010
- CSCI C212/A592: Introduction to Software Systems: Spring 2009

*Undergraduate Research Opportunities in Computing**January 2011 – Present*

- Research Mentor for Christopher Zakian and Yitian Peng: Spring 2011

Honors and Awards

- Associate Instructor of the Year – Computer Science, Indiana University 2009 – 2010
- Paul and Virginia B. Miller Scholar – EECS, University of Kansas 2004 – 2005
- School of Engineering Honor Roll – University of Kansas Fall 2000 – Spring 2005
- Tau Beta Pi National Scholar Fall 2004
- Senior Everitt Award – EECS, University of Kansas Spring 2004
- W. Harold Otto National Merit Scholar 2000 – 2004
- May Landis Scholar – Mathematics, University of Kansas 2001 – 2002
- University Scholar Finalist (top 40 sophomores) 2001
- First Place in Archery at Sunflower State Games 1998

Recent Activities

Scheme Workshop 2011 – Program Committee **2011**
<http://scheme2011.ucombinator.org/>

PL Wonks **March 2007 – Present**
<http://lambda.soic.indiana.edu/>

- Member of and frequent speaker at weekly, programming-languages seminar

Crystal Space 3D **February 2005 – October 2006**
<http://www.crystalspace3d.org>

- A core developer of this Open-Source, 3D SDK
- Coauthor of the Shared Class Facility providing reference counting and interface querying
- Invited participant in the Crystal Space Conference 2006 in Aachen, Germany

Lambda Group **June 2003 – May 2005**
<http://wiki.ittc.ku.edu/lambda>

- Member of this readings group sponsored by Dr. Alexander
- Presented a session on fixed point combinators

Engineering Expo Chair for ACM **August 2004 – April 2005**
– Oversaw the development of multiple Expo projects to represent the Electrical Engineering and Computer Science Department

Tau Beta Pi – The Engineering Honor Society **November 2002 – May 2005**
– Recording secretary for 2004-2005 school year
– Delegate to the annual Regional Conference in Spring 2003 and Spring 2004.
– Delegate to the 2004 National Convention and member of the committee charged with drafting an amendment to the Tau Beta Pi constitution addressing Computer Science eligibility.

Honors Undergraduate Research (Dr. Alexander) **June 2003 – May 2004**
– Developed a system for describing constraints over Abstract Syntax Trees
– Implemented first-class patterns in Haskell

Engineering Expo Project for IEEE **November 2003 – February 2004**
– Coordinated a project to display a game of Tic-Tac-Toe on the side of a building
– Board displayed on building using lights
– Lights are controlled by the X10 home automation technology
– Users play the game through a web based interface

Talks

- **Linear-Log Time Control-Flow Analysis with Flow-Sensitivity and Predicate-Awareness.** POPL Student Presentation Session, January 27, 2011.
- **Control Flow Analysis.** Algorithms Reading Group, Indiana University, September 20, 2010.
- **Scrap Your Zippers: A Generic Zipper for Heterogeneous Types.** Programming Languages Seminar, Indiana University, September 17, 2010.

- **Control-Flow Analysis and Abstract Interpretation: Running Your Program without Running Your Program.** Programming Languages Seminar, Indiana University, October 2, 2009.
- **Deriving Syntax-Case from First Principals: How to turn a name freshener into a macro expander.** Programming Languages Seminar, Indiana University, February 6, 2009.
- **Verifying a Filesystem: A Successful Failure.** (Co-speaker with Joseph Near and Aaron Kahn.) Programming Languages Seminar, Indiana University, April 25, 2008.
- **Scrapping Scrap your Nameplate.** Programming Languages Seminar, Indiana University, March 7, 2008.
- **Meta-Programming in Haskell with GADTs.** Programming Languages Seminar, Indiana University, October 26, 2007.
- **A Poet’s Musings on Efficient Computation.** Programming Languages Seminar, Indiana University, April 10, 2007.
- **Seven at One Stroke: Results from a Cache-Oblivious Paradigm for Scalable Matrix Algorithms.** Programming Languages Seminar, Indiana University, October 19, 2006.
- **Existential Types: How to write first class patterns in Haskell.** Programming Languages Seminar, Indiana University, September 7, 2006.

Publications

- Michael D. Adams, Andrew W. Keep, Jan Midtgaard, Matthew Might, Arun Chauhan, and R. Kent Dybvig. **Flow-sensitive sub-zero control-flow analysis in linear-log time.** 2011. (Draft)
- Michael D. Adams. **Scrap your zippers: A generic zipper for heterogeneous types.** In *WGP ’10: Proceedings of the 2010 ACM SIGPLAN workshop on Generic programming*, pages 13–24. ACM, New York, NY, USA, 2010. doi: 10.1145/1863495.1863499.
- Andrew W. Keep, Michael D. Adams, Lindsey Kuper, William E. Byrd, and Daniel P. Friedman. **A pattern matcher for miniKanren or how to get into trouble with CPS macros.** In *Scheme ’09: Proceedings of the 2009 Scheme and Functional Programming Workshop*, number CPSLO-CSC-09-03 in California Polytechnic State University Technical Report, pages 37–45. 2009. URL http://digitalcommons.calpoly.edu/csse_fac/83/.
- Michael D. Adams and R. Kent Dybvig. **Efficient nondestructive equality checking for trees and graphs.** In *ICFP ’08: Proceeding of the 13th ACM SIGPLAN international conference on Functional programming*, pages 179–188. ACM, New York, NY, USA, 2008. doi: 10.1145/1411204.1411230.
- Peter Gottschling, David S. Wise, and Michael D. Adams. **Representation-transparent matrix algorithms with scalable performance.** In *ICS ’07: Proceedings of the 21st annual international conference on Supercomputing*, pages 116–125. ACM, New York, NY, USA, 2007. doi: 10.1145/1274971.1274989.
- Michael D. Adams and David S. Wise. **Seven at one stroke: Results from a cache-oblivious paradigm for scalable matrix algorithms.** In *MSPC ’06: Proceedings of the 2006 workshop on Memory system performance and correctness*, pages 41–50. ACM, New York, NY, USA, 2006. doi: 10.1145/1178597.1178604.
- Michael D. Adams and David S. Wise. **Fast additions on masked integers.** *SIGPLAN Notices*, 41(5):39–45, May 2006. ISSN 0362-1340. doi: 10.1145/1149982.1149987.
- Michael D. Adams. **The representation of constraints, annotations and first class patterns over arbitrary data types in Haskell.** Honors Undergraduate Research, University of Kansas, May 2004.