

# ANDREW K. PETERSEN

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## EDUCATION **The University of Washington** Seattle, WA

Ph.D., Computer Science: expected 2010

Ph.C., Computer Science: December 2006

M.S., Computer Science: June 2003

## **The University of Tennessee** Knoxville, TN

B.S., Computer Science and Mathematics: May 2001

Top Graduate in Natural Sciences

## TEACHING **The University of Toronto** Mississauga, ON

EXPERIENCE Lecturer, July 2007-present

- Advising students and handling administrative duties as the CS faculty advisor.
- Teaching introductory computer programming, computer organization, data structures and algorithms, operating systems, and compilers in classes ranging from 7 to 180 students on both the Mississauga and St. George campuses.
- Received student evaluations for “overall contribution to the course” ranging from 6.3 to 7.0 out of 7.0 with an average of 6.56.
- Facilitating undergraduate involvement in the departmental community by working closely with the departmental society and organizing activities including industry seminars, professional development events, and social gatherings.
- Supervising ongoing undergraduate research projects on mobile devices, GPU programming, and collaboration in the classroom.
- Co-supervising a project to develop a uniform memory model for first and second year CS courses.
- Designing and deploying a campus-wide data aggregation application that facilitates data collection for program evaluation and pedagogical research.
- Developed a new compiler course first taught in Fall 2008 and restructured the computer organization course to use reconfigurable hardware in laboratory work.

## **The University of Washington** Seattle, WA

Instructor, June-August 2006

- Planned and delivered an 85-person introductory programming course (CSE 143).
- Directly managed four undergraduate teaching assistants and collaborated with the instructor and assistants of the previous course in the series (CSE 142).
- Received an overall 4.6/5.0 on evaluations with 4.9/5.0 for “instructor’s contribution.”

## **The University of Washington** Seattle, WA

Teaching Assistant, August 2001-March 2002 and January-March 2006

- Developed and taught twice-weekly discussion and quiz sections for an introductory programming course (CSE 143).
- Nominated by students for the University Outstanding Teaching Assistant award.

- Managed the weekly assignments and directed the full-quarter project for a graduate-level software engineering course (CSE 503).

**The University of Tennessee** Knoxville, TN

Teaching Assistant, August-December 1999 and August-December 2000

- Led small-group discussion sections on systems and network programming (CS360).
- Lectured on development processes and developed and managed a project architecture for undergraduate and graduate-level software engineering courses (CS340 and CS525).

PROJECTS

**Assessment and the Bimodal Distribution in CS1**

Collaborators: Michelle Craig and Daniel Zingaro

The University of Toronto Mississauga, July 2010-present

- Analyzing CS1 tests from across the US and Canada to determine what concepts and skills are being assessed and which are assessed together.
- Collecting and analyzing responses to CS1 assessments at the University of Toronto's three campuses in 2010 and 2011.

**Static Analysis Frameworks for the Eclipse CDT**

Undergraduate Collaborator: Elliott Baron

The University of Toronto Mississauga and RedHat, August 2009-March 2010

- Developed a plugin for the Eclipse CDT that uses property simulation to check static properties in code.
- Investigated approximation techniques to merge states without a theorem prover.
- Resulted in presentations at EclipseCon 2010 and the Toronto Helios DemoCamp.

**Curriculum Development with Support for Models and Standards**

Collaborator: Joanna Szurmak

The University of Toronto Mississauga, April 2009-present

- Investigating methods for identifying and analyzing connections between curriculum objectives, learning settings, pedagogical models, and learning standards.
- Exploring means for identifying “proficiency” and “mastery” based on learning outcomes.
- Developing software support for developing and analyzing curriculum objectives within courses and across programs.

**A Consistent Pedagogical Memory Model for Python, Java, and C**

Collaborator: Paul Gries

The University of Toronto, February 2009-present

- Developing a framework for pedagogical memory models for various languages.
- Exploring techniques for teaching the memory model to novice students and for introducing consistent extensions to more advanced learners.
- Implementing a standalone application for visualizing the Python memory model and debugging Python programs.

**Anonymous Feedback in Large Lecture Courses**

The University of Toronto Mississauga, September 2007-present

- Implemented a cgi system for accepting anonymous messages from students.
- Developing extensions to the system to enable recovery of users in emergencies.
- Exploring best practices in the use of anonymous feedback to shape a course.
- Investigating the impact of continuous, timely feedback on student morale and perceptions of the course.

**WaveScalar**

Advisors: Mark Oskin and Susan Eggers

The University of Washington, September 2003-present

- Implemented an optimizing compiler for the WaveScalar dataflow architecture that explores code generation from imperative languages.
- Developed folding and elimination optimizations that reduce control overhead by 80% on the WaveScalar processor.
- Explored optimizations that use programmer annotations and alias analyses to implement thread-level speculation and increase memory parallelism.
- Patented the WaveCache (US Patent #7490218).

### Software Testing and Fault Detection

Advisors: David Notkin and Manuvir Das  
Microsoft Research, June-September 2003

- Adapted dependence-detection tools to indicate error proneness in software modules.
- Mined code repositories, error databases, and source code for a large product and searched for correlations with error rate in the resulting data.

### Languages for Quantum Computation

Advisor: Mark Oskin  
The University of Washington, March 2002-June 2003

- Created a new notation for describing quantum computation which resulted in a quals project and workshop presentations.

### JOURNAL PUBLICATIONS

Joanna Szurmak and Andrew Petersen. “Learning Outcomes Assessment Matrix (LOAM): a Software-Supported Process for Identifying and Scaffolding Complex Learning Outcomes.” *Ubiquitous Learning* volume 3 issue 2, 111-118. April 2010.

Steve Swanson, Andrew Schwerin, Martha Mercaldi, Andrew Petersen, Andrew Putnam, Ken Michelson, Mark Oskin and Susan Eggers. “The WaveScalar Architecture.” *Transactions on Computer Systems (TOCS)* volume 25 number 2. May 2007.

### REFEREED CONFERENCE PROCEEDINGS

Andrew Petersen, Michelle Craig, and Daniel Zingaro. “Reviewing CS1 Exam Question Content.” *ACM Technical Symposium on Computer Science Education (SIGCSE)*. March 2011.

Rebecca Bates and Andrew Petersen. “Collaborative Learning via Team Testing.” *American Society for Engineering Education North Midwest Section Conference*. October 2010.

Martha Mercaldi, Steve Swanson, Andrew Petersen, Andrew Putnam, Andrew Schwerin, Mark Oskin and Susan Eggers. “Instruction Scheduling for Tiled Dataflow Architectures.” *Architectural Support for Programming Languages and Operating Systems (ASPLOS)*. October 2006.

Andrew Petersen, Martha Mercaldi, Steve Swanson, Andrew Putnam, Andrew Schwerin, Mark Oskin and Susan Eggers. “Controlling Control Overhead in Dataflow Architectures.” *Symposium on Parallel Architectures and Compilation Techniques (PACT)*. September 2006.

Martha Mercaldi, Steve Swanson, Andrew Petersen, Andrew Putnam, Andrew Schwerin, Mark Oskin and Susan Eggers. “Modeling Instruction Placement on a Spatial Architecture.” *Symposium on Parallel Architectures and Applications (SPAA)*. July 2006.

Steve Swanson, Andrew Putnam, Martha Mercaldi, Ken Michelson, Andrew Petersen, Andrew Schwerin, Mark Oskin, and Susan Eggers. “Area-Performance Trade-offs in Tiled Dataflow Architectures.” *International Symposium on Computer Architecture (ISCA)*. June 2006.

### CONFERENCE PRESENTATIONS

Joanna Szurmak and Andrew Petersen. “Growing Instructional Programs in LOAM.” *Librarians’ Information Literacy Annual Conference (LILAC)*. March 2010.

Andrew Petersen and Sarah Petersen. “Anonymous Email: Timely, Relevant Feedback in Large Lecture Courses.” *ACM Technical Symposium on Computer Science Education (SIGCSE)* poster presentation. March 2008.

Steve Swanson, Andrew Petersen, and Mark Oskin. “The Death of ILP.” *Architectural Support for Programming Languages and Operating Systems (ASPLOS) Wild and Crazy Ideas Session IV*. October 2004.

Steve Swanson, Andy Schwerin, Andrew Petersen, Mark Oskin, and Susan Eggers. “Threads on the Cheap: Multithreaded Execution in a WaveCache Processor.” *Workshop on Complexity-Effective Design (WCED) held in conjunction with the International Symposium on Computer Architecture (ISCA)*. June 2004.

Andrew Petersen and Mark Oskin. “A New Algebraic Foundation for Quantum Programming Languages.” *Workshop on Non-Silicon Computation (NSC) held in conjunction with the International Symposium on Computer Architecture (ISCA)*. June 2003.

#### HONORS

- ◇ University of Toronto Computer Science Student Union Teaching Award (2009)
- ◇ Nominee, UW College of Engineering Outstanding Teaching Assistant (2002)
- ◇ Honorable Mention, NSF Graduate Fellowship (2001, 2002)
- ◇ Patricia Lynch and Theodora and Eugene Russell Memorial Scholarship (2001)
- ◇ Phi Beta Kappa Academic Honors Society (2001)
- ◇ Pi Mu Epsilon Mathematics Honors Society (2001)
- ◇ Finalist, National Merit Scholarship (1997)

#### ACADEMIC SERVICE

- ◇ Member, UTM Curriculum Committee (2009-2010)
- ◇ Reviewer, Consortium for Computing Sciences in Colleges (Northeastern Region) Symposium (CCSCNE) (2009)
- ◇ Reviewer, Innovation and Technology in Computer Science Education Conference (ITICSE) (2009-2010)
- ◇ Faculty Advisor, UTM Computer Science (2008-present)
- ◇ Member, UTM Experiential Learning Committee (2008-present)
- ◇ Member, Integrate Educational Technology Committee (2007-present)
- ◇ Reviewer, SIGCSE Computer Science Education Symposium (2007-present)
- ◇ Reviewer, Transactions on Architecture and Code Optimization (TACO) (2006-2008)
- ◇ Representative, UW CSE Curriculum Committee (2006-2007)
- ◇ Student Representative, UW CSE Undergraduate Writing Assessment Committee (2006)
- ◇ Reviewer, High Performance Computing Architectures (HPCA) (2004)
- ◇ Reviewer, Software - Practice and Experience (2004)
- ◇ Reviewer, Architectural Support for Programming Languages and Operating Systems (ASPLOS) (2004)
- ◇ Graduate Lead and Member, UW CSE Graduate Admissions Committee (2003, 2004)
- ◇ Senator, UW Graduate and Professional Student Senate (2003-2005)
- ◇ Reviewer, MICRO (2003)