

## *Ian Wehrman*

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### *Research Interests*

Concurrent programming language semantics and reasoning.

### *Education*

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| Ph.D. Computer Science<br>The University of Texas at Austin                                      | <i>expected</i> 2011 |
| M.Sc. Computer Science<br>Washington University in St. Louis                                     | 2006                 |
| B.Sc. Computer Science<br>Webster University   | 2004                 |
| Formal Logical Methods for System Security and<br>Correctness<br>Marktoberdorf Summer School     | 2007                 |
| Engineering Methods and Tools for Software<br>Safety and Security<br>Marktoberdorf Summer School | 2008                 |

### *Industrial Experience*

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| Programming Principles Intern<br>Microsoft Research, Cambridge | 2008 |
| Software Reliability Intern<br>Microsoft Research, Redmond     | 2007 |

### *Awards & Scholarships*

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| Graduate Professional Development Award<br>The University of Texas at Austin   | 2008 |
| Student Housing, Participation and Travel Grant<br>Marktoberdorf Summer School | 2007 |
| MCD Doctoral Fellowship<br>The University of Texas at Austin                   | 2006 |
| Natural Sciences Dean's Excellence Award<br>The University of Texas at Austin  | 2006 |
| Student Travel Grant<br>Federated Logic Conference                             | 2006 |
| Graduate Research Assistantship<br>Washington University in St. Louis          | 2005 |

Distinguished Master's Fellowship 2004  
Washington University in St. Louis

Math & Computer Science Dept. Honors 2004  
Webster University

### *Research Projects*

Graphical Models of Separation Logic 2008  
A semantic theory for based on separation logic suited to concurrency and weak memory.  
Adviser: C. A. R. Hoare

Orc 2006 – 2008  
A language for computation orchestration. In particular, a timed semantics and specification logic.  
Adviser: Jayadev Misra

HAVOC 2007  
Heap-aware automated verification of C programs. In particular, using static types to prove allocatedness assertions and encode nonaliasing assumptions.  
Adviser: Shuvendu Lahiri

Slothrop 2005 – 2006  
An automated equational theorem prover based on Knuth-Bendix completion and modern termination checking. First tool to automatically find a completion of the theory of two commuting group endomorphisms.  
Adviser: Aaron Stump

Survivable Workflow Transaction Infrastructure 2005 – 2006  
A survivable, evolvable computing infrastructure for long-running, critical applications. In particular: extending a Byzantine agreement protocol to support replicated clients and servers.  
Adviser: Kenneth J. Goldman

RSP1 2004 – 2005  
A novel programming language with dependent types, pattern matching, dependent records and imperative features. In particular: compilation and termination checking.  
Adviser: Aaron Stump

The Rogue Validity Checker 2005  
A proof-producing, cooperating decision procedure for quantifier-free first-order logic with equality, arrays and linear arithmetic. In particular: finding small conflict sets in a non-clausal setting.  
Adviser: Aaron Stump

### *Refereed Papers*

#### **Journals**

- Ian Wehrman, David Kitchin, William R. Cook and Jayadev Misra. *A Timed Semantics of Orc*. Theoretical Computer Science 402 (2-3), pp. 234-248. 2008.

#### **Conferences**

- Sajeeva Pallemulle, Ian Wehrman and Kenneth Goldman. *Byzantine Fault Tolerant Execution of Long-Running Distributed Applications*. In Proceedings of the 18th IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS 2006).

- Ian Wehrman, Aaron Stump and Edwin Westbrook. *Slothrop: Knuth-Bendix Completion with a Modern Termination Checker*. In Proceedings of the 17th International Conference on Rewriting Techniques and Applications (RTA 2006). pp. 287-296.
- Edwin Westbrook, Aaron Stump and Ian Wehrman. *A Language-based Approach to Functionally Correct Imperative Programming*. 10th ACM SIGPLAN International Conference on Functional Programming (ICFP 2005), pp. 268-279.

### Workshops

- Ian Wehrman, David Kitchin, William R. Cook and Jayadev Misra. *A Timed Semantics of Orc (excerpt)*. 2nd Workshop on Event-Based Semantics (WEBS 2008).
- Aaron Stump and Ian Wehrman. *Property Types: Semantic Programming for Java*. 13th International Workshop on Foundations and Developments of Object-Oriented Languages (FOOL/WOOD 2006).
- Ian Wehrman and Aaron Stump. *Mining Propositional Simplification Proofs for Small Validating Clauses*. Third Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR 2005). ENTCS, Volume 144, Issue 2, 19 January, 2006, pp. 79-91.

### Technical Reports

Ian Wehrman, David Kitchin, William R. Cook and Jayadev Misra. *Properties of the Timed Operational and Denotational Semantics of Orc*. University of Texas at Austin. TR-07-65. December, 2007.

Ian Wehrman. *Knuth-Bendix Completion with Modern Termination Checking*. Master's thesis, Washington University in St. Louis. WUCSE-2006-45. August, 2006.

Ian Wehrman, Sajeeva Pallemulle and Ken Goldman. *Extending Byzantine Fault Tolerance to Replicated Clients*. WU-CSE-2006-7. February, 2006.

Edwin Westbrook, Aaron Stump and Ian Wehrman. *A Language-based Approach to Functionally Correct Imperative Programming*. WU-CSE-2005-32. July, 2005.

### Presentations

*Term Rewriting for Fully Automatic Equational Theorem Proving*. Two 1-hour talks for the ACL2 Seminar at the University of Texas at Austin. September, 2006.

*Slothrop: Completion with Modern Termination Checking*. 15-minute system description for RTA 2006 in Seattle, WA. August, 2006.

*Completion with Modern Termination Checking*. 1-hour Master's thesis defense at Washington University in St. Louis. July, 2006.

*Building Diverse Computer Systems*. 1.5-hour lecture for the Survivable Systems Seminar at Washington University in St. Louis. October, 2006.

*Mining Propositional Simplification Proofs for Small Validating Clauses*. 25-minute talk for the Third Workshop on Pragmatics of Decision Procedures in Automated Reasoning at the University of Edinburgh, Scotland. July, 2005.

*A Simple Linear Time  $(1 + \epsilon)$ -Approximation Algorithm for  $k$ -Means Clustering in Any Dimensions*. 2-hour lecture for the Approximation Algorithms seminar at Washington University in St. Louis. April, 2004.

*Equational Unification.* 1.5-hour lecture for the Equational Theorem Proving seminar at Washington University in St. Louis. March, 2004.

### *Graduate Coursework*

The University of Texas at Austin:

**2008** Feature-oriented Programming

**2007** Verification and Validation, Model Checking Reactive Systems, Computation Orchestration

**2006** Distributed Computing, Introduction to Mathematical Logic, Supervised Teaching in Computer Science

Washington University in St. Louis:

**2006** Seminar on Computational Logic: Proof Theory of Arithmetic, Seminar on Computational Complexity Theory (*unofficial*)

**2005** Introduction to Automated Theorem Proving, Computational Geometry, Introduction to Formal Languages and Automata, Advanced Data Structures, Seminar on Survivable Systems (*unofficial*), Seminar on Algorithms: Approximation Algorithms, Seminar on Computational Logic: Equational Theorem Proving

**2004** Introduction to Artificial Intelligence, Programming Language Theory, Advanced Algorithms

### *Academic Service*

Sub-reviewer:

- 4th International Joint Conference on Automated Reasoning (IJCAR 2008)
- 22nd European Conference on Object-Oriented Programming (ECOOP 2008)
- IARCS Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2007)
- 9th International Conference on Coordination Models and Languages (COORD 2007)

Teaching Assistant:

- Computation Orchestration (The University of Texas at Austin)
- Logic, Sets and Functions (The University of Texas at Austin)

Course grader:

- Logic & Discrete Mathematics (Washington University in St. Louis)
- Programming Language Theory (Washington University in St. Louis)

Tutor:

- Undergraduate Physics, Math and Computer Science (Webster University)

### *Miscellaneous*

Citizenship: United States of America

Born: June 7, 1980 in St. Louis, Missouri

References: Furnished on request

Last updated: September 13, 2008