

William Randall Cook

Research Interests

Programming languages, modeling languages, feature-oriented programming, interfacing programming languages and databases, distributed computing and web services, software engineering, type theory, web-based information systems.

Education

- 1989 Ph.D. Computer Science, Brown University
Dissertation: *A Denotational Semantics of Inheritance*
Advisor: Peter Wegner
- 1985 M.Sc. Computer Science, Brown University
Project: *An Embedded Graph Editor for VLSI*
Advisor: Gérard Baudet
- 1984 B.Sc. Computer Science, Tulane University
Honors Thesis: *Translation of a Procedural Language for Execution on a Lambda-Calculus Machine*
Advisor: Gyorgy Révész

Research Activities

Journal Publications

- I. Wehrman, D. Kitchin, W. R. Cook, and J. Misra. A timed semantics of Orc. *Theoretical Computer Science*, 402(2-3):234–248, August 2008. DOI: 10.1016/j.tcs.2008.04.037.
- W. R. Cook and J. Barfield. Web services versus distributed objects: A case study of performance and interface design. *International Journal of Web Services Research (IJWSR)*, 4:49–64, 2007.
- J. Misra and W. R. Cook. Computation orchestration: A basis for wide-area computing. *Journal of Software and Systems Modeling*, May 2006.
- W. R. Cook and J. Palsberg. A denotational semantics of inheritance and its correctness. *Information and Computation*, 114(2):329–350, November 1994.
- W. R. Cook. A proposal for making Eiffel type-safe. *The Computer Journal*, 32(4):305–311, 1989.

Book Chapters and Theses

- W. R. Cook, W. Hill, and P. Canning. Inheritance is not subtyping. In C. A. Gunter and J. C. Mitchell, editors, *Theoretical Aspects of Object-Oriented Programming*, pages 497–517. MIT Press, 1993.
- W. R. Cook. *A Denotational Semantics of Inheritance*. PhD thesis, Brown University PhD Thesis, 1989.

Refereed Conference Papers

- B. Wiedermann, A. Ibrahim, and W. R. Cook. Interprocedural query extraction for transparent persistence. In *Proc. of ACM Conf. on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, 2008.
- W. R. Cook. AppleScript. In *Proc. of the The Third Conference on History of Programming Languages (HOPL III)*, 2007.

- S. Rosario, D. Kitchin, A. Benveniste, W. R. Cook, S. Haar, and C. Jard. Event structure semantics of Orc. In *Proc. of the 4th International Workshop on Web Services and Formal Methods (WS-FM)*, 2007. Also INRIA Rapport de recherche (2007) #00155016.
- B. A. Wiedermann and W. R. Cook. Extracting queries by static analysis of transparent persistence. In *Proc. of the ACM Conf. on Principles of Programming Languages (POPL)*, pages 199–210, 2007.
(18% accepted)
- W. R. Cook and J. Barfield. Web services versus distributed objects: A case study of performance and interface design. In *Proc. of the IEEE Intl. Conf. on Web Services (ICWS)*, pages 419–426, 2006.
Best Paper. (16% accepted)
- S. Swords and W. R. Cook. Soundness of the simply typed lambda calculus in ACL2. In *Intl. Workshop on the ACL2 Theorem Prover and Its Applications (ACL2)*, pages 35–39, 2006.
- D. Kitchin, W. R. Cook, and J. Misra. A language for task orchestration and its semantic properties. In *Proc. of the Intl. Conf. on Concurrency Theory (CONCUR)*, pages 477–491, 2006.
- W. R. Cook, S. Patwardhan, and J. Misra. Workflow patterns in Orc. In *Proc. of the 8th Intl. Conf. on Coordination Models and Languages (COORDINATION)*, Springer LNCS 4038, pages 82–96, 2006.
(36% accepted)
- A. Ibrahim and W. R. Cook. Automatic prefetching by traversal profiling in object persistence architectures. In *Proc. European Conf. on Object-Oriented Programming (ECOOP)*, pages 50–73, 2006.
(13% accepted, program committee paper)
- E. Ernst, K. Ostermann, and W. R. Cook. A virtual class calculus. In *Proc. of the ACM Conf. on Principles of Programming Languages (POPL)*, pages 270–282, 2006.
(18% accepted)
- R. Harrejon, D. Batory, and W. R. Cook. Evaluating support for features in advanced modularization technologies. In *Proc. European Conf. on Object-Oriented Programming (ECOOP)*, pages 169–194. Springer, 2005.
(14% accepted, program committee paper)
- W. R. Cook and S. Rai. Safe query objects: statically typed objects as remotely executable queries. In *Proc. of the 27th Int. Conf. on Software engineering (ICSE)*, pages 97–106, New York, NY, USA, 2005. ACM Press.
(14% accepted)
- W. R. Cook. Interfaces and specifications for the Smalltalk collection classes. In *Proc. of ACM Conf. on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, pages 1–15, 1992.
(12% accepted, program committee paper)
- W. R. Cook, W. Hill, and P. Canning. Inheritance is not subtyping. In *Proc. of the ACM Symp. on Principles of Programming Languages (POPL)*, pages 125–135, 1990.
(16% accepted)
- G. Bracha and W. R. Cook. Mixin-based inheritance. In *Proc. of ACM Conf. on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*,

pages 303–311, 1990.
(15% accepted)

P. Canning, W. R. Cook, W. Hill, and W. Olthoff. Interfaces for strongly-typed object-oriented programming. In *Proc. of ACM Conf. on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, pages 457–467, 1989.
(25% accepted)

W. R. Cook and J. Palsberg. A denotational semantics of inheritance and its correctness. In *Proc. of ACM Conf. on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, pages 433–444, 1989.
(25% accepted)

P. Canning, W. R. Cook, W. Hill, J. Mitchell, and W. Olthoff. F-bounded polymorphism for object-oriented programming. In *Proc. of Conf. on Functional Programming Languages and Computer Architecture (FPCA)*, pages 273–280, 1989.
(26% accepted)

W. R. Cook. A proposal for making Eiffel type-safe. In *Proc. European Conf. on Object-Oriented Programming (ECOOP)*, pages 57–70. British Computing Society Workshop Series, 1989.
(23% accepted)

Workshop Papers

S. Nedunuri and W. R. Cook. “Specializing and optimizing declarative domain models.” *The 4th OOPSLA Workshop on Domain-Specific Modeling*, October 2004.

S. Nedunuri and W. R. Cook. “Transforming declarative models using patterns in MDA.” *The OOPSLA Workshop on Best Practices for Model Driven Software Development*, October 2004.

W. R. Cook. Object-oriented programming versus abstract data types. In *Proc. of the REX Workshop/School on the Foundations of Object-Oriented Languages (FOOL)*, volume 489 of *Springer LNCS*, pages 151–178, 1990.

Technical Reports

I. Wehrman, D. Kitchin, W. R. Cook, and J. Misra. Properties of the timed operational and denotational semantics of Orc. Technical Report TR-07-65, UT Austin, Department of Computer Sciences, December 2007.

K. Morton, D. Kitchin, and W. Cook. Orc-X: Combining orchestrations and XQuery. Technical Report TR-07-63, UT Austin, Department of Computer Sciences, December 2007.

W. R. Cook and A. H. Ibrahim. Programming languages & databases: What’s the problem? Technical Report TR-07-10, UT Austin, Department of Computer Sciences, February 2007.

D. Brown and W. R. Cook. Monadic memoization mixins. Technical Report TR-07-11, UT Austin, Department of Computer Sciences, February 2007.

D. Kitchin, W. R. Cook, and J. Misra. Semantic properties of asynchronous Orc. Technical Report TR-06-32, UT Austin, Department of Computer Sciences, January 2007.

W. R. Cook and S. Rai. Safe query objects: Statically typed objects as remotely executable queries. Technical Report TR-04-17, UT Austin, Department of Computer Sciences, May 2004.

W. R. Cook and B. Dalio. The design of a memory management unit: A SLAP/Lucifer case study. Technical Report CS-85-03, Brown University, 1985.

W. R. Cook. Translation of a procedural language for execution on a lambda-calculus machine. Honors Thesis, Tulane University Department of Computer Science, 1984.

Patents

W. R. Cook and M. Gannholm. “Rule based database security system and method”. USPTO 6,820,082. Filed April 3, 2000; Issued November 16, 2004.

W. R. Cook and M. Gannholm. “Method and apparatus for creating interactive web page objects”. USPTO 6,178,432. Filed September 1996; Issued January 2001.

Panels

“Peak Objects”. Panel, Summing up the Past and Trying to Outline the Future, at ECOOP, July 5, 2006.

G. Cohen, W. R. Cook, R. Filman, L. Tesler. “Onward! Panel: New Programming Constructs Beyond Inheritance, Patterns, and Notation: What’s left?”, Object-Oriented Programming Systems, Languages, and Applications (OOPSLA), 2002.

G. Jones, W. R. Cook, D. Straus. “Demonstrating the Advantages of Open Architecture Software”, Partner Relationship Management 2002. San Francisco, April 2002.

O. Nierstrasz, A. Snyder, A. S. Williams, W. R. Cook. “Open distributed processing” Addendum to the Proceedings on Object-Oriented Programming Systems, Languages, and Applications, 1994, pp 67-71.

Y. Shan, T. A. Cargill, B. Cox, W. R. Cook, M. E. S. Loomis, A. Snyder: “Is Multiple Inheritance Essential to OOP?” *Addendum to the Proceedings on Object-Oriented Programming Systems, Languages, and Applications* 1993, pp. 360-363.

R. E. Johnson, K. Beck, G. Booch, W. R. Cook, R. P. Gabriel, Rebecca Wirfs-Brock: “How to Get a Paper Accepted at OOPSLA” *Addendum to the Proceedings on Object-Oriented Programming Systems, Languages, and Applications* 1993: pp. 429-436.

W. R. Cook. “BOF on inheritance”. *Addendum to the Proceedings on Object-Oriented Programming Systems, Languages, and Applications*, ACM SIGPLAN Notices, 23(5):41-42, May 1987.

Invited Talks and Lectures

“Academic writing”. CRA-W/CDC Programming Languages Summer School, UT Austin, May 9-11, 2007.

“Getting started in PL design research.” CRA-W/CDC Programming Languages Summer School, UT Austin, May 9-11, 2007.

“AppleScript, Latency, Databases & Web Services”. Invited talk at Lang.NET Symposium, August 2, 2006.

Lightning talk on “Native Queries”. Presented at OOPSLA 2005.

“Using ACL2 for Programming Language Metatheory” ACL2 Weekly Seminary, September 14 & 21, 2005.

“PL/DB: What’s the problem?”, Microsoft Research, October 2004.

“Interfacing programming languages & databases”, Brown University, July 2004.

“Industry & Academia”, UTCS Industry vs. Academia Perspective seminar, December, 2004.

“How to be secure in a state of flux”. UT Austin IForum, March 2004.

“Policy-based authorization” invited lectures at Brown, WPI, Northeastern, UT Austin, UC Irvine, UC Santa Cruz, OGI, UIUC, Penn State, and University of Washington, Spring 2003.

W. R. Cook and W. Harris. “Design of a modern scripting language” (Video) Distinguished Lecture Series VI. University Video Communications, Stanford, CA. 1993.

W. R. Cook. “A Semantics of Inheritance”. Workshop on Encapsulation, Modularity, and Reusability. University of Texas at Austin, 1987.

Articles W. R. Cook and C. Rosenberger. “Native Queries for Persistent Objects, A Design White Paper” Dr. Dobb’s Journal (DDJ), February 2006.

W. R. Cook. “Allegis Enterprise Platform”. Allegis Whitepaper 2002.

W. R. Cook. “Selecting an Effective PRM Package”. eBizQ, 2001.

“Allegis Delivers Web Services for Partner Relationship Management (PRM) Using Microsoft .NET Enterprise Servers” February 2001.

W. R. Cook. “Allegis Service Architecture”. Allegis Whitepaper 2000.

“Allegis Pioneers Partner Relationship Management with Microsoft Windows DNA” June 2000.

Unpublished Manuscripts

W. R. Cook and W. Harris. “The Open Scripting Architecture: Automating, Integrating, and Customizing Applications.” Unpublished manuscript, 1993.

W. R. Cook. “A self-ish model of inheritance”. Unpublished manuscript, 1987.

Professional Activities

Grants

6/2008 Co-Principal Investigator with Jayadev Misra. Structured Wide-area Programming. NSF #CCF-6752487, \$513,000.

10/2007 Co-Principal Investigator with Don Batory. Science of Design: Architectural Metaprogramming. NSF #CCF-0724979, \$800,000.

12/2005 2006 Summer Research Assignment Grant, UT Austin.

9/2005 Principal Investigator. db4objects, Incorporated. Unrestricted research grant.

3/2005 Principal Investigator. Integrating Programming Languages and Databases. NSF CAREER # CCF-0448128, \$400,000 over five years.

Workshop & Conference Organization

2006 Research Program Committee Chair
ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)

- 2006 Co-organizer and program committee chair
First Dynamic Languages Symposium
- 2007 Panel organizer
Objects and Databases: State of the Union 2006 at OOPSLA
- 2005 Co-organizer
Workshop on Best Practices for Model Driven Software Development (BPMDS).
- 2004 Co-chair, Industrial Practice Track
13th WWW Conference, 2004.
- 1994 Workshop on Writing, with Richard Gabriel
ACM Conference on Object-Oriented Programming Systems, Languages, and Applications

Program Committees

- 2009 European Conference on Object-Oriented Programming (ECOOP)
- 2008 OOPSLA Doctoral Symposium
- 2008 Generative Programming and Component Engineering (GPCE)
- 2008 European Conference on Object-Oriented Programming (ECOOP)
- 2008 Coordination
- 2008 Dynamic Languages Symposium (DLS)
- 2007 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
Research and Essays committees
- 2007 Compiler Construction (CC)
- 2007 Coordination
- 2007 Dynamic Languages Symposium (DLS)
- 2006 European Conference on Object-Oriented Programming (ECOOP)
- 2005 Principles of Programming Languages (POPL)
- 2005 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 2005 European Conference on Object-Oriented Programming (ECOOP)
- 2004 Onward! at Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 2004 Workshop on Foundations of Aspect-Oriented Languages (FAOL) at the 2nd International Conference on Aspect-Oriented Software Development (AOSD)
- 2004 Workshop in Software Model Engineering (WiSME) at the UML Conference
- 2003 Domain Driven Development track at Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 2003 Onward! at Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 2003 Workshop on Foundations of Aspect-Oriented Languages (FAOL) at the 2nd International Conference on Aspect-Oriented Software Development (AOSD)
- 1996 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 1994 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)

- 1993 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 1992 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)
- 1991 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)

Workshop Participation

- 2004 The 4th Workshop on Domain-Specific Modeling at OOPSLA
- 2004 The Workshop on Best Practices for Model Driven Software Development at OOPSLA
- 2003 Workshop on Foundations of Aspect-Oriented Languages at AOSD
- 2002 Generative Programming in the context of Model-Driven Architecture at OOPSLA
- 1993 Presented “Object-oriented programming versus abstract data types.” Second Workshop on Foundations of Object-Oriented Languages, Stanford University
- 1990 Invited to REX Workshop/School on the Foundations of Object-Oriented Languages.

Reviewing

- 2004 Grant proposal review and panelist: National Science Foundation
- 2000, 2004 ACM Transactions on Programming Languages and Systems (TOPLAS)
- 1993 Software Practice and Experience (SPE)
- 1990 Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)

Professional Organizations

- 1984- Member of Association for Computing Machinery
- 2002- Member of IEEE and IEEE Computing Society
- 2005- Member of Java Community Process (JCP)
- 2000-2003 Allegis Representative to World Wide Web Consortium (W3C)

Teaching

Department of Computer Sciences, University of Texas at Austin

- Fall 2008 **Object-Oriented Software Development (aka Model-Driven Software Development)**. Undergraduate CS 371S
co-taught with James C. Browne
- Fall 2008 **Research/Teaching in Computer Science**. Graduate CS 398T
co-taught with J Moore
- Fall 2007 **Honors Programming Languages**. Undergraduate CS 345H
Instructor: 3.0/5.0, Course: 2.8/5.0, Enrollment: 37
- Spring 2007 **Programming Languages**. Undergraduate CS 345
Instructor: 3.9/5.0, Course: 3.5/5.0, Enrollment: 48
- Spring 2007 **Programming Languages**. Graduate CS 386L
Enrollment: 16 Instructor: 4.3/5.0, Course: 4.1/5.0, Enrollment: 22
- Spring 2006 **Programming Languages**. Graduate CS 386L
Enrollment: 16 Instructor: 3.9/5.0, Course: 3.6/5.0, Enrollment: 16

- Fall 2005 **Honors Programming Languages.** Undergraduate CS 345H
Instructor: 4.0/5.0, Course: 3.6/5.0, Enrollment: 31
- Spring 2005 **Programming Languages.** Undergraduate CS 345
Instructor: 4.5/5.0, Course: 4.2/5.0, Enrollment: 43
- Fall 2004 **Programming Languages.** Graduate CS 386L
Instructor: 4.5/5.0, Course: 4.4/5.0, Enrollment: 11
- Spring 2004 **Programming Languages.** Undergraduate CS 345
Instructor: 4.4/5.0, Course: 4.1/5.0, Enrollment: 47
- Fall 2003 **Integrating Programming Languages and Databases.** Graduate Seminar CS 397T
Instructor: 4.3/5.0, Course: 4.1/5.0, Enrollment: 9

Department of Computer Engineering, Santa Clara University

- 1990-1991 **Programming Language Concepts** (graduate level)

Department of Computer Science, Brown University

- 1986 **Teaching Assistant: Advanced Database Concepts**

Department of Computer Science, Tulane University

- 1982 **Data Structures and Algorithms** (CS 118)
Taught regular computer science course in summer school
- 1981 **PDP-11 Assembly Language** (CS 201)
Taught regular computer science course in summer school
- 1981-1984 **Teaching Assistant**
Introduction to Computer Science, Data Structures.
Led discussion sections for eight semesters, Head TA

Advising

Doctoral Students

- Ben Wiedermann: Static analysis and optimization of object persistence clients
- Ali Ibrahim: Safety and dynamic optimization of object persistence clients
- David Kitchin: Programming languages and agents
- Srinivas Nedunuri: Synthesis for model-based software development

Doctoral Committees

- Hanbing Liu: Formal Specification and Verification of a JVM and its bytecode verifier. Supervised by J Moore.
- Jia Liu: Algebraic Manipulations of Software Designs and Feature Oriented Programming. Supervised by Don Batory.
- Mark Grechanik: Design, Analysis, and Verification of Large-Scale Polylingual Systems. Supervised by Don Batory and Dewayne E. Perry.
- Roberto E. Lopez-Herrejon: Understanding Feature Modularity. Supervised by Don Batory.

Rui Mao: A Metric-Space Database Storage Manager and Its Applications in Bioinformatics. Supervised by Daniel Miranker.

Undergraduate Independent Study

- 2005 Daniel Brown: In search of type functions.
- 2005 Janel Barfield: Interface design and performance of web services.
- 2004 Christina Wang: Course proposal – Software Development Studio.
- 2004 Aniket Shah: Review of the Extensibility Problem.
- 2004 Chihou Ng: Design and implmenetation of a College Student Application Suite for mobile devices.

Employment

University of Texas at Austin

- 2003- *Assistant Professor*
Department of Computer Sciences

Allegis Corporation, San Francisco CA

- 2002-2003 *Chief Technical Officer*
Responsible for technology strategy and technical communication to prospects, customers and analysts.
- 2001-2002 *VP Engineering*
Focused on process improvement while managing 60 engineers in development, QA, documentation, training and tech support.
- 1997-2001 *Chief Architect*
Created initial product demos, developed system architecture, wrote technical specifications, participated in implementation and code reviews.
- 1997 *Founder*
Worked with CEO to define company vision and secure \$60M in top-tier venture funding.

Net-It Software, Los Altos CA

- 1995-1997 *Chief Architect and Acting VP Engineering*
Led development process from product requirements to implementation. Hands-on manager of a team of 10 engineers.
- 1995 *Founder*
Created initial product vision, assembled team, worked with CEO to secure funding.

BAM! Software Inc, New York NY and Los Altos CA

- 1993-1995 *Software Architect*
Led design and implementation. Participated in project planning, client relationships, domain analysis, and technical documentation.

Apple Computer, Cupertino CA

- 1992-1993 *Engineering Manager*
Managed the group of five engineers in the AppleScript development team, with focus on creating high-quality software.

1991-1992 *Senior Software Engineer*
Designed the AppleScript language and Open Scripting Architecture with Warren Harris. Guided implementation, market positioning, and technical documentation.

Hewlett-Packard Laboratories, Palo Alto CA

1988-1991 *Member of Technical Staff*
Research on foundations of typed object-oriented programming.

Products

Primary Architect

- 1998-2002 **Allegis Sales Partner / Allegis eBusiness Suite**
Allegis Corporation (acquired by Click Commerce)
Chief Architect, Implementor, Engineering Manager
Introduced at Demo 99, Allegis Sales Partner is a Partner Relationship Management solution for large enterprises to manage and optimize indirect sales channels.
- 1997-1998 **Net-It Central** (acquired by Informative Graphics)
Net-It Software
Chief Architect, Implementor, Engineering Manager
Creates complete, searchable intranet sites from folders of documents.
- 1996-1997 **Net-It Now!**
Net-It Software
Chief Architect, Implementor, Engineering Manager
Net-It Now! captures the printed output of any Windows document and converts it into interactive, java-rendered web pages.
- 1995 **Writer's Solution**
BAM! Software for Prentice Hall/Computer Curriculum Corp.
Software Architect, Implementor
Developed multimedia production tools for creating an 8 CD highly interactive multimedia curriculum for middle school writing and grammar instruction.
- 1993 **AppleScript**
Apple Computer
Co-Architect, Implementor, Engineering Manager
AppleScript is a user-level dynamic language for integration, customization, and automation of applications on the Macintosh.
- 1983 **SLAW**, Tulane University
Implementor
SLAW is a tool for creating *structure charts*, a program design notation. SLAW was used by students in introductory CS courses to document designs and to create the diagrams for the book *ANSI Fortran 77: An Introduction to Structured Software Design* by V. Law.
- 1981 **Z**, Tulane University
Co-implementor
This variant of Z, the 95% program editor, was the primary text editor in the Tulane Computer Science department from 1981 until the mid 1990's.

Influence on Commercial Products

2005 **db4o** version 5.0
db4objects, Inc.

Native Queries are the key feature of version 5.0 of the db4objects database

- 2005 **Plain Old Java Queries (POJQ)**
java.net open source project
An open source implementation of Safe Query Objects

Awards

Academic

- 1985 Philips Fellow, Brown University
1984 University Fellow, Brown University
1984 Magna cum Laude, Tulane University

Industrial

- 2001 What Works: Ten Significant CRM Implementations of 2001
Aberdeen Group
Product: Allegis eBusiness Suite
2000 What Works: Ten Significant CRM Implementations of 2000
Aberdeen Group
Product: Allegis Sales Partner
1998 Technology of the Year Award
MACWorld
Product: AppleScript
1998 A-List Award, Knowledge Management
Crossroads Research
Product: Net-It Central
1997 Finalist for Excellence in Software Award (the Codies)
Software Publishers Association (SPA)
Product: Writer's Solution

September 17, 2008