

Chandrasekhar Boyapati

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Education

- 09/98–12/03 **Massachusetts Institute of Technology (MIT)** **Cambridge, MA**
Doctor of Philosophy in Electrical Engineering and Computer Science, February 2004
Thesis: *SafeJava: A Unified Type System for Safe Programming*
Martin Rinard, advisor

Minor in Approximation Algorithms
- 09/96–12/98 **Massachusetts Institute of Technology (MIT)** **Cambridge, MA**
Master of Science in Electrical Engineering and Computer Science, September 1998
Thesis: *JPS: A Distributed Persistent Java System*
Barbara Liskov, advisor
- 08/92–05/96 **Indian Institute of Technology (IIT)** **Madras, India**
Bachelor of Technology in Computer Science and Engineering, July 1996
Thesis: *Worst Case Efficient Data Structures for Priority Queues & Deques with Heap Order*
C. Pandu Rangan, advisor

Appointments

- 01/04– **University of Michigan (UM)** **Ann Arbor, MI**
Assistant Professor
EECS Department
- 09/00–12/03 **Massachusetts Institute of Technology (MIT)** **Cambridge, MA**
Graduate Research Assistant in the Programming Analysis and Compilation Group
Martin Rinard, advisor
- 06/00–08/00 **Microsoft Research (MSR)** **Redmond, WA**
Research Intern in the Advanced Programming Languages Group
Erik Ruf, mentor
- 06/99–08/99 **Xerox Palo Alto Research Center (PARC)** **Palo Alto, CA**
Research Intern in the Aspect-Oriented Programming Group
Gregor Kiczales, mentor
- 01/99–05/99 **Massachusetts Institute of Technology (MIT)** **Cambridge, MA**
Teaching Assistant for Computer Systems Engineering (6.033)
Frans Kaashoek, lecturer

01/98–05/98	Massachusetts Institute of Technology (MIT) Teaching Assistant for Laboratory in Software Engineering (6.170) Barbara Liskov and Daniel Jackson, lecturers	Cambridge, MA
09/96–05/00	Massachusetts Institute of Technology (MIT) Graduate Research Assistant in the Programming Methodology Group Barbara Liskov, advisor	Cambridge, MA
08/95–11/95	Indian Institute of Technology (IIT) Teaching Assistant for Introduction to Computing (CS 110) C. Pandu Rangan, lecturer	Madras, India
08/92–05/96	Indian Institute of Technology (IIT) Student Researcher in the Theoretical Computer Science Laboratory C. Pandu Rangan, advisor	Madras, India

Selected honors and awards

- 2002 ACM SIGSOFT distinguished paper award for ISSTA 2002 paper.
- 1996 Gordon Wu Fellowship, Princeton University's most prestigious award for graduate study in engineering. Declined.
- 1992 Ranked 11th out of over 100,000 students in the All India Joint Entrance Examination for admission to the IITs.
- 1992 Ranked in the top 20 out of over 400,000 students in the West Bengal Higher Secondary Exam.
- 1992 Recipient of the National Talent Search Scholarship awarded to the top 0.5% of over 150,000 students, based on a nationwide test conducted by the National Council of Educational Research and Training (NCERT), India.
- 1988&1989 Got the top rank among nearly 20,000 students in the Science Aptitude and Talent Search Test conducted by All India Science Teachers Association, West Bengal branch, both in '88 & '89.

New courses introduced at University of Michigan

EECS 490: Programming Languages

Course teaches fundamental concepts in programming languages. It covers different programming languages including functional, imperative, object-oriented, and logic programming languages; different programming language features for naming, control flow, memory management, concurrency, and modularity; as well as methodologies, techniques, & tools for writing correct and maintainable programs.

EECS 590: Advanced Programming Languages

Course teaches fundamental concepts in programming languages (PL) as well as recent topics and trends in PL research. Topics include semantics, type systems, static & dynamic program analysis, program verification using theorem provers, and software model checking. Course focuses on applying PL concepts to improve software reliability. It includes semester long individual research project.

Courses taught at University of Michigan

EECS 183: Elementary Programming Concepts (Fall 11, Fall 08, Winter 08)

EECS 203: Discrete Mathematics (Fall 10, Fall 09)

EECS 490: Programming Languages (Fall 06, Fall 05, Fall 04)

EECS 590: Advanced Programming Languages (Winter 11, Winter 10, Winter 09, Winter 07, Winter 06, Winter 05, Winter 04)

Graduate students supervised

Michael Roberson Now at Microsoft Ph.D. Thesis: Glass Box Software Model Checking

Paul Darga Now at Google

Pratibha Permandla Now at Microsoft

Murtaza Basrai Now at Google

Melanie Harries Now at Bloomberg

Bashar Al-Rawi Now at Microsoft

Other Ph.D. committee memberships

Rajiv Ravindran Now at HP Advisor: Scott Mahlke

Hongtao Zhong Now at Google Advisor: Scott Mahlke

Zaher Andraus Now at University of Michigan Advisor: Karem Sakallah

Grants

1. Title: **Program Analysis Techniques for Efficient Software Model Checking**

Sponsor: AFOSR

Dates: 01/2007–12/2010

Amount: \$530,609

PI: Chandrasekhar Boyapati

Co-PI: Karem Sakallah

2. Title: **Multicore Curriculum Development**

Sponsor: Intel

Dates: 06/2006–08/2007

Amount: \$65,000

PI: Mark Brehob

Co-PI's: Chandrasekhar Boyapati, Scott Mahlke

3. Title: **Advanced Type Systems for Safe Programming**

Sponsor: Microsoft

Dates: 02/2004-Indefinite (Gift)

Amount: \$20,000

PI: Chandrasekhar Boyapati

Patents

The Aspect-Oriented Programming patent has been cited over 6000 times according to Google Scholar.

1. **Aspect-Oriented Programming**
Gregor Kiczales, John Lamping, Crista Lopes, James Hugunin, Erik Hilsdale, Chandra Boyapati.
U.S. Patent No. 6,467,086, issued October 2002.

Theses

2. **SafeJava: A Unified Type System for Safe Programming**
Chandrasekhar Boyapati.
Ph.D. Thesis, Electrical Engineering and Computer Science, MIT, February 2004.
3. **JPS: A Distributed Persistent Java System**
Chandrasekhar Boyapati.
S.M. Thesis, Electrical Engineering and Computer Science, MIT, September 1998.
4. **Worst Case Efficient Data Structures for Priority Queues and Deques With Heap Order**
Chandrasekhar Boyapati.
B.Tech. Thesis, Computer Science and Engineering, IIT Madras, May 1996.

Conference Publications

My research has resulted in eight papers in the prestigious PLDI, POPL, and OOPSLA conferences. These conferences are highly selective with an acceptance rate of about 20% and take about 25 papers per year. Another paper of mine that was published at the premier software testing conference ISSTA received the ACM SIGSOFT distinguished paper award. According to Google Scholar five of my papers have each been cited over 100 times, including two which have each been cited over 300 times.

The underlined authors are students supervised by me.

5. **A Static Analysis for Automatic Detection of Atomicity Violations in Java Programs**
Michael Roberson and Chandrasekhar Boyapati.
Submitted to ACM Symposium on Principles of Programming Languages
(*POPL 2012*), Philadelphia, Pennsylvania, January 2012.
6. **Efficient Modular Glass Box Software Model Checking**
Michael Roberson and Chandrasekhar Boyapati.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2010*), Reno/Tahoe, Nevada, pages 4-21, October 2010.
Acceptance Rate: 28%.
7. **Efficient Software Model Checking of Soundness of Type Systems**
Michael Roberson, Melanie Harries, Paul Darga, Chandrasekhar Boyapati.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2008*), Nashville, Tennessee, pages 493-504, October 2008.
Acceptance Rate: 28%.

8. **A Type System for Preventing Data Races and Deadlocks in the Java Virtual Machine Language**
Pratibha Permandla, Michael Roberson, Chandrasekhar Boyapati.
ACM Conference on Languages, Compilers, and Tools for Embedded Systems
(*LCTES 2007*), San Diego, California, pages 1-10, June 2007.
Acceptance Rate: 28%.
9. **Efficient Software Model Checking of Data Structure Properties**
Paul Darga and Chandrasekhar Boyapati.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2006*), Portland, Oregon, pages 363-382, October 2006.
Acceptance Rate: 16%.
10. **Lazy Modular Upgrades in Persistent Object Stores**
Chandrasekhar Boyapati, Barbara Liskov, Liuba Shrira, Chuang-Hue Moh, Steven Richman.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2003*), Anaheim, California, pages 403-417, October 2003.
Acceptance Rate: 18%.
11. **Ownership Types for Safe Region-Based Memory Management in Real-Time Java**
Chandrasekhar Boyapati, Alexandru Salcianu, William Beebe, Martin Rinard.
ACM Conference on Programming Language Design and Implementation
(*PLDI 2003*), San Diego, California, pages 324-337, June 2003.
Acceptance Rate: 21%.
12. **Ownership Types for Object Encapsulation**
Chandrasekhar Boyapati, Barbara Liskov, Liuba Shrira.
ACM Symposium on Principles of Programming Languages
(*POPL 2003*), New Orleans, Louisiana, pages 213-223, January 2003.
This is an invited paper.
13. **Ownership Types for Safe Programming: Preventing Data Races and Deadlocks**
Chandrasekhar Boyapati, Robert Lee, Martin Rinard.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2002*), Seattle, Washington, pages 211-230, November 2002.
Acceptance Rate: 20%.
14. **Korat: Automated Testing Based on Java Predicates**
Chandrasekhar Boyapati, Sarfraz Khurshid, Darko Marinov.
ACM International Symposium on Software Testing and Analysis
(*ISSTA 2002*), Rome, Italy, pages 123-133, July 2002.
This paper received an **ACM SIGSOFT Distinguished Paper Award**.
Acceptance Rate: 27%.
15. **A Parameterized Type System for Race-Free Java Programs**
Chandrasekhar Boyapati and Martin Rinard.
ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
(*OOPSLA 2001*), Tampa, Florida, pages 56-69, October 2001.
Acceptance Rate: 19%

Workshop Publications

16. **Safe Runtime Downcasts With Ownership Types**
Chandrasekhar Boyapati, Robert Lee, Martin Rinard.
ECOOP International Workshop on Aliasing, Confinement and Ownership
(*ECOOP IWACO 2003*), Darmstadt, Germany, July 2003.
17. **Safe Concurrent Programming in Java**
Chandrasekhar Boyapati, Robert Lee, Martin Rinard.
MIT LCS/AI Student Oxygen Workshop
(*MIT SOW 2002*), Gloucester, Massachusetts, July 2002.
18. **A Type System for Preventing Data Races**
Chandrasekhar Boyapati and Martin Rinard.
MIT LCS/AI Student Oxygen Workshop
(*MIT SOW 2001*), Gloucester, Massachusetts, July 2001.

Technical Reports

19. **Towards an Extensible Virtual Machine**
Chandrasekhar Boyapati.
MIT-LCS-TR-842, Laboratory for Computer Science, MIT, April 2002.
20. **Relaxed Fibonacci Heaps: An Alternative to Fibonacci Heaps With Worst Case Rather Than Amortized Time Bounds**
Chandrasekhar Boyapati and C. Pandu Rangan.
TR-TCS-95-07, Theoretical Computer Science Laboratory, IIT Madras, November 1995.
21. **On $O(1)$ Concatenation of Deques with Heap Order**
Chandrasekhar Boyapati and C. Pandu Rangan.
TR-TCS-95-05, Theoretical Computer Science Laboratory, IIT Madras, March 1995.

Invited talks

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| 04/2006 | Dagstuhl Seminar
Stefan Edelkamp, Stefan Leue, Alberto Lluch-Lafuente, Willem Visser, organizers | Dagstuhl, Germany |
| 04/2006 | Iowa State University
Gary Leavens, host | Ames, IA |
| 04/2003 | Microsoft Research
Jim Larus, host | Redmond, WA |
| 04/2003 | University of Massachusetts
Lori Clarke, host | Amherst, MA |
| 04/2003 | Rice University
Keith Cooper, host | Houston, TX |

04/2003	University of Chicago David MacQueen, host	Chicago, IL
04/2003	University of California at San Diego Brad Calder, host	San Diego, CA
03/2003	IBM T. J. Watson Research Center David Bacon, host	Yorktown, NY
03/2003	University of Michigan Brian Noble, host	Ann Arbor, MI
11/2002	Microsoft Research Jim Larus, host	Redmond, WA
02/2002	New England Programming Languages Symposium (NEPLS) Michael Ernst, host	Cambridge, MA
10/2001	Church Seminar, Boston University Assaf Kfoury, host	Boston, MA

Technical program committees

ESOP 2012: ETAPS European Symposium on Programming
OOPSLA 2011: ACM OO Programming, Systems, Languages, and Applications (External Review Committee)
PLDI 2010: ACM Programming Language Design and Implementation (External Review Committee)
SAS 2007: NIST Static Analysis Summit
IWACO 2007: ECOOP International Workshop on Aliasing, Confinement and Ownership
SAC 2007: ACM Symposium on Applied Computing: Software Verification Track
TAP 2007: IFIP Tests and Proofs
OOPSLA 2006: ACM Object-Oriented Programming, Systems, Languages, and Applications
COMPSAC 2006: IEEE Computer Software and Applications Conference
PLDI 2004: ACM Programming Language Design and Implementation
SOW 2002: MIT Student Oxygen Workshop

I was also invited to serve on the following program committees but I declined because I wanted to submit papers to the conferences and program committee members were not allowed to do so:

OOPSLA 2010: ACM Object-Oriented Programming, Systems, Languages, and Applications
PLDI 2008: ACM Programming Language Design and Implementation

Scientific review panels

NSF Review Panel (2007)
 NSF Review Panel (2004)

University of Michigan service

EECS-CSE CS LSA Undergraduate Advisor	09/2008-Present
EECS-CSE Graduate Admissions Committee	09/2006-08/2008
EECS-CSE CS Program Curriculum Committee	09/2004-08/2006