

# Chandrasekhar Boyapati

Department of Electrical Engineering and Computer Science  
University of Michigan  
Room 4628 CSE, 2260 Hayward Street, Ann Arbor, MI 48109-2122  
(734) 763-9015  
[bchandra@eecs.umich.edu](mailto:bchandra@eecs.umich.edu)  
<http://www.eecs.umich.edu/~bchandra>

## 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 and Deques with Heap Order*  
C. Pandu Rangan, advisor

## Appointments

- 01/04– **University of Michigan (U-M)** **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	<b>Massachusetts Institute of Technology (MIT)</b> Teaching Assistant for Laboratory in Software Engineering (6.170) Barbara Liskov and Daniel Jackson, lecturers	<b>Cambridge, MA</b>
09/96–05/00	<b>Massachusetts Institute of Technology (MIT)</b> Graduate Research Assistant in the Programming Methodology Group Barbara Liskov, advisor	<b>Cambridge, MA</b>
08/95–11/95	<b>Indian Institute of Technology (IIT)</b> Teaching Assistant for Introduction to Computing (CS 110) C. Pandu Rangan, lecturer	<b>Madras, India</b>
08/92–05/96	<b>Indian Institute of Technology (IIT)</b> Student Researcher in the Theoretical Computer Science Laboratory C. Pandu Rangan, advisor	<b>Madras, India</b>

## Selected honors and awards

2002	ACM SIGSOFT distinguished paper award.
1996	Gordon Wu Fellowship, Princeton University's most prestigious award for graduate study in engineering. Declined.
1992	Ranked 11 <sup>th</sup> 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 U-M

### **EECS 490: Programming Languages**

Teaches fundamental concepts in programming languages. Course 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**

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

## Grants

- Title:** Program Analysis Techniques for Efficient Software Model Checking  
**Sponsor:** AFOSR  
**Dates:** 01/2007–12/2009  
**Amount:** \$530,609  
**PI:** Chandrasekhar Boyapati  
**Co-PI:** Karem Sakallah
- Title:** Multicore Curriculum Development Proposal  
**Sponsor:** Intel  
**Dates:** 06/2006–08/2007  
**Amount:** \$65,000  
**PI:** Mark Brehob  
**Co-PI's:** Chandrasekhar Boyapati, Scott Mahlke
- Title:** Advanced Type Systems for Safe Programming  
**Sponsor:** Microsoft  
**Dates:** 02/2004-Indefinite (Gift)  
**Amount:** \$20,000  
**PI:** Chandrasekhar Boyapati

## Publications

My research has resulted in seven papers in the prestigious PLDI, POPL, and OOPSLA conferences. All three of 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 a premier software testing conference, ISSTA, received an ACM SIGSOFT distinguished paper award. Four of my papers have each been cited over 100 times, according to Google Scholar.

- Efficient Software Model Checking of Soundness of Type Systems**  
Michael Roberson, Melanie Agnew, 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%.
- 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, June 2007.  
Acceptance Rate: 28%.
- 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%.

4. **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%.
5. **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.
6. **Ownership Types for Safe Region-Based Memory Management in Real-Time Java**  
Chandrasekhar Boyapati, Alexandru Salcianu, William Beebee, Martin Rinard.  
ACM Conference on Programming Language Design and Implementation (*PLDI 2003*), San Diego, California, pages 324-337, June 2003.  
Acceptance Rate: 21%.
7. **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.
8. **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%.
9. **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 won an **ACM SIGSOFT Distinguished Paper Award**.  
Acceptance Rate: 27%.
10. **Safe Concurrent Programming in Java**  
Chandrasekhar Boyapati, Robert Lee, Martin Rinard.  
MIT LCS/AI Student Oxygen Workshop (*MIT SOW 2002*), Gloucester, Massachusetts, July 2002.
11. **Towards an Extensible Virtual Machine**  
Chandrasekhar Boyapati.  
MIT-LCS-TR-842, Laboratory for Computer Science, MIT, April 2002.
12. **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%

13. **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.
14. **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.
15. **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.

## Patents

16. **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.

## Invited talks

- |         |  |                          |
|---------|--|--------------------------|
| 04/2006 | <b>Dagstuhl Seminar</b><br>Stefan Edelkamp, Stefan Leue, Alberto Lluch-Lafuente, Willem Visser, organizers | <b>Dagstuhl, Germany</b> |
| 04/2006 | <b>Iowa State University</b><br>Gary Leavens, host   | <b>Ames, IA</b>          |
| 04/2003 | <b>Microsoft Research</b><br>Jim Larus, host   | <b>Redmond, WA</b>       |
| 04/2003 | <b>University of Massachusetts</b><br>Lori Clarke, host  | <b>Amherst, MA</b>       |
| 04/2003 | <b>Rice University</b><br>Keith Cooper, host   | <b>Houston, TX</b>       |
| 04/2003 | <b>University of Chicago</b><br>David MacQueen, host   | <b>Chicago, IL</b>       |
| 04/2003 | <b>University of California at San Diego</b><br>Brad Calder, host  | <b>San Diego, CA</b>     |
| 03/2003 | <b>IBM T. J. Watson Research Center</b><br>David Bacon, host   | <b>Yorktown, NY</b>      |
| 03/2003 | <b>University of Michigan</b><br>Brian Noble, host   | <b>Ann Arbor, MI</b>     |

11/2002	<b>Microsoft Research</b> Jim Larus, host	<b>Redmond, WA</b>
02/2002	<b>New England Programming Languages Symposium (NEPLS)</b> Michael Ernst, host	<b>Cambridge, MA</b>
10/2001	<b>Church Seminar, Boston University</b> Assaf Kfoury, host	<b>Boston, MA</b>

## Technical program committees

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

## Scientific review panels

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

## University of Michigan service

EECS-CSE	CS Undergraduate Advisor (LSA),	09/2008-present
EECS-CSE	Graduate Admissions Committee,	09/2006-08/2008
EECS-CSE	CS Program Curriculum Committee,	09/2004-08/2006