

AFFILIATION	Assistant Professor University of Illinois at Urbana-Champaign Department of Computer Science 201 N. Goodwin Ave., Siebel Center 3226, Urbana, IL 61801, USA. <i>E-mail:</i> madhu@cs.uiuc.edu <i>Web:</i> http://www.cs.uiuc.edu/~madhu	<i>Work:</i> +1-217-244-1323
RESEARCH INTERESTS	<ul style="list-style-type: none"> • <i>Software analysis and verification:</i> software reliability, automatic verification, dataflow analysis, abstraction based verification, dynamic verification, interface synthesis, heap analysis • <i>Concurrency:</i> atomicity and data-races; partial-order methods • <i>Model checking:</i> algorithms, temporal logics, tools • <i>Security:</i> protecting Web services, SQL injection attacks, database security • <i>Databases:</i> algorithms for XML • <i>Theory:</i> logic, automata theory, concurrency, games. 	
EDUCATION	<p>Doctor of Philosophy (Ph.D.) in Theoretical Computer Science Institute of Mathematical Sciences, University of Madras, Chennai, India. Advisors: Prof. P. S. Thiagarajan and Prof. R. Ramanujam Thesis title: <i>Control and Synthesis of Open Reactive Systems</i> Thesis submitted in November, 2001.</p> <p>Master of Science (M.Sc.) by Research in Theoretical Computer Science Institute of Mathematical Sciences, Anna University, Chennai, India. Thesis title: <i>An On-the-fly Algorithm for Linear-time Temporal Logic</i></p> <p>Bachelor of Science (B.Sc.) in Mathematics Loyola College, Madras University, Chennai, India.</p>	<p style="text-align: right;"><i>September 2002</i></p> <p style="text-align: right;"><i>Aug 1994–Aug 1996</i></p> <p style="text-align: right;"><i>Mar 1991–Mar 1994</i></p>
RESEARCH EXPERIENCE	<p>Assistant Professor, University of Illinois at Urbana Champaign Dept. of Computer Science, Urbana, IL, USA.</p> <p>Research Associate, University of Pennsylvania Dept. of Computer and Information Sciences, Prof. Rajeev Alur's group Philadelphia, USA.</p> <p>Research Assistant (Wissenschaftlicher Angestellter), Rheinisch Westfälische Technische Hochschule (RWTH), Aachen, Germany. In computer science department, I7-chair of Prof. Wolfgang Thomas</p> <p>Junior/Senior Research Fellow, Institute of Mathematical Sciences Pursuing masters (M.Sc.) and doctoral (Ph.D.) studies, Institute of Mathematical Sciences, Chennai, India.</p>	<p style="text-align: right;"><i>2005–now</i></p> <p style="text-align: right;"><i>Jan 2002–Dec 2004</i></p> <p style="text-align: right;"><i>Nov 1999–Aug 2000</i></p> <p style="text-align: right;"><i>Aug 1994–Nov 1999</i> <i>Aug 2000–Feb 2001</i></p>

**PROFESSIONAL
ACTIVITIES****Program Committees:****Conferences:**

- **International Conference on Concurrency Theory, (CONCUR'08)**
Toronto, Canada, 2008.
- **Int'l Colloquium on Automata, Languages and Programming (ICALP'07)**
Wroclaw, Poland, 2007.
- **Foundations of Software Technology and Theoretical Computer Science (FSTTCS'05)**
Hyderabad, India, 2007.
- **ACM Symposium on Applied Computing (SAC'05)**
Dijon, France, 2006.
- **Computer Aided Verification (CAV'05)**
Edinburgh, Scotland, UK, 2005.
- **FORMATS-FTRTFT '04**
Joint Conference on Formal Modelling and Analysis of Timed Systems (FORMATS) and
Formal Techniques in Real-Time and Fault Tolerant Systems(FTRTFT),
Grenoble, France, 2004.

Workshops:

- **Chair: International Workshop on Verification of Infinite-State Systems, (INFINITY'07)**
Lisbon, Portugal, 2007.
- **Chair: Workshop on Games in Design and Verification (GAMES'06)**
Seattle, USA, 2008.
- **Chair: Workshop on Software Verification, with FSTTCS'05**
Organized with Sriram Rajamani, Microsoft Research
Hyderabad, India, 2005.
- **Workshop on Games in Design and Verification (GAMES'05)**
Edinburgh, Scotland, UK, 2005.

Invited talks:

- **Invited Tutorial: Learning Algorithms and Formal Verification**
*Eighth International Conference on Verification, Model Checking and Abstract Interpretation (VM-
CAI)*
Nice, France, 2007.
- **Invited Talk: Visibly pushdown automata for XML**
ICDT Workshop on Emerging Research Opportunities in Web Data Management (EROW)
Barcelona, Spain, 2007.
- **Invited Talk: Automata theory for nested structures**
FLOC Workshop on Games for Logic and Programming Languages (GALOP)
Seattle, USA, 2007.
- **Invited Talk: Making the Stack Visible: Visibly Pushdown Automata**
Seventh International Workshop on Logic and Computational Complexity (LCC)
Chicago, USA, 2007.

PUBLICATIONS

Publications are available online at <http://www.cs.uiuc.edu/~madhu>

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- THESES**
- [T1] **Control and Synthesis of Open Reactive Systems.** Dissertation (Ph.D.), Madras University, Chennai, India, November 2002.
 - [T2] **An On-the-fly Algorithm for Linear-time Temporal Logic.** Master's thesis, Anna University, Chennai, India, August 1996.
- CONFERENCE PUBLICATIONS**
- [1] **CANDID: Preventing SQL Injection Attacks using Dynamic Candidate Evaluations.** In *ACM Conference on Computer and Communications Security (CCS)*, 2007 (with S. Bandhakavi, P. Bisht and V.N. Venkatakrisnan).
 - [2] **A Robust Class of Context-sensitive Languages.** In *Logic in Computer Science (LICS)*, pages 161–170. IEEE Computer Society, Wroclaw, Poland, 2007 (with S. La Torre and G. Parlato).
 - [3] **Causal Dataflow Analysis for Concurrent Programs.** In *Tools and Algorithms for the Construction and Analysis of Systems, 13th International Conference (TACAS)*, volume 4424 of LNCS, pages 102–116, Braga, Portugal, 2007 (with A. Farzan).
 - [4] **Visibly Pushdown Automata for Streaming XML.** In *16th International Conference on World Wide Web (WWW)*, pages 1053–1062. 2007. (with V. Kumar and M. Viswanathan)
 - [5] **Causal Atomicity.** In *Computer Aided Verification, 18th International Conference (CAV)*, volume 4144 of LNCS, pages 315–328, Seattle, USA, 2006 (with A. Farzan).
 - [6] **Languages of Nested Trees.** In *Computer Aided Verification, 18th International Conference (CAV)*, volume 4144 of LNCS, pages 329–342, Seattle, USA, 2006 (with R. Alur and S. Chaudhuri).
 - [7] **Minimization, Learning, and Conformance Testing of Boolean Programs.** In *17th International Conference on Concurrency Theory (CONCUR)*, volume 4137 of LNCS, pages 203–217, Bonn, Germany, 2006 (with V. Kumar and M. Viswanathan).
 - [8] **Adding Nesting Structure to Words.** In *Developments in Language Theory (DLT)*, volume 4036 of LNCS, pages 1–13, Santa Barbara, USA, 2006 (with R. Alur).
 - [9] **A Fixpoint Calculus for Local and Global Program Flows.** In *33rd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, ACM, pages 153–165, Charleston, USA, 2006 (with R. Alur and S. Chaudhuri).
 - [10] **Symbolic Compositional Verification by Learning Assumptions.** In *Computer Aided Verification, 17th International Conference (CAV)*, volume 4036 of LNCS, pages 548–562, Edinburgh, Scotland, UK, 2005 (with R. Alur and W. Nam).
 - [11] **The MSO Theory of Connectedly Communicating Processes.** In *Foundations of Software Technology and Theoretical Computer Science, 25th International Conference (FSTTCS)*, volume 3821 of LNCS, pages 201–212, Hyderabad, India, 2005 (with P. S. Thiagarajan and S. Yang).

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- [12] **Perturbed Timed Automata.** In *Hybrid Systems: Computation and Control (HSCC)*, volume 3414 of *LNCS*, pages 70–85, Zurich, Switzerland, 2005 (with R. Alur and S. La Torre).
- [13] **Congruences for Visibly Pushdown Languages.** In *Automata, Languages and Programming, 32nd International Colloquium (ICALP)*, volume 3580 of *LNCS*, pages 1102–1114, Lisbon, Portugal, 2005 (with R. Alur, V. Kumar and M. Viswanathan).
- [14] **Synthesis of Interface Specifications for Java Classes.** In *Proceedings of the 32nd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, ACM, pages 98–109, Long Beach, USA, 2005 (with R. Alur, P. Cerný and W. Nam).
- [15] **On-the-Fly Reachability and Cycle Detection for Recursive State Machines.** In *Tools and Algorithms for the Construction and Analysis of Systems, 11th International Conference (TACAS)*, volume 3440 of *LNCS*, pages 61–76, Edinburgh, UK, 2005 (with R. Alur, S. Chaudhuri and K. Etessami).
- [16] **Visibly Pushdown Games.** In *Foundations of Software Technology and Theoretical Computer Science, 24th International Conference (FSTTCS)*, volume 3328 of *LNCS*, pages 408–420, Chennai, India, 2004 (with C. Löding and O. Serre).
- [17] **Optimal Reachability for Weighted Timed Games.** In *Automata, Languages and Programming: 31st International Colloquium (ICALP)*, volume 3142 of *LNCS*, pages 122–133, Turku, Finland, 2004 (with R. Alur and M. Bernadsky).
- [18] **Decision Problems for Timed Automata: A Survey.** In *Formal Methods for the Design of Real-Time Systems, School on Formal Methods for the Design of Computer, Communication and Software Systems*, volume 3185 of *LNCS*, pages 1–24, Bertinoro, Italy, 2004 (with R. Alur).
- [19] **Visibly Pushdown Languages.** *Proceedings of the 36th Annual ACM Symposium on Theory of Computing (STOC)*, ACM, pages 202–211, Chicago, USA, 2004 (with R. Alur).
- [20] **A Temporal Logic of Nested Calls and Returns.** *Tools and Algorithms for the Construction and Analysis of Systems, 10th International Conference (TACAS)*, volume 2988 of *LNCS*, pages 467–481, Barcelona, Spain, 2004 (with R. Alur and K. Etessami).
- [21] **Symbolic Computational Techniques for Solving Games.** *Special Issue for BMC'03, Electronic Notes in Theoretical Computer Science (ENTCS)*, volume 89(4):578-592, 2003 . (with W. Nam and R. Alur).
- [22] **Modular Strategies for Infinite Games on Recursive Game Graphs.** In *Proc. 15th Computer-Aided Verification conference (CAV '03)*, volume 2725 of *LNCS*, pages 67–79, Boulder, Colorado, 2003 (with R. Alur and S. La Torre).
- [23] **Timed Control with Partial Observability.** In *Proc. 15th Computer-Aided Verification conference (CAV '03)*, volume 2725 of *LNCS*, pages 180–192, Boulder, Colorado, 2003 (with P. Bouyer, D. D'Souza and A. Petit).
- [24] **Playing Games with Boxes and Diamonds.** In *Proc. 14th International Conference on Concurrency Theory (CONCUR '03)*, volume 2761 of *LNCS*, pages 127–141, Marseille, France, 2003 (with R. Alur and S. La Torre).
- [25] **Model-checking Trace Event Structures.** In *Proc. 18th Annual IEEE Symp. on Logic in Computer Science, (LICS '03)*, pages 371–380, IEEE, Ottawa, Canada, 2003.

- [26] **Modular Strategies for Recursive Game Graphs.** *In Proc. 9th Int'l Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS '03)*, volume 2619 of LNCS, pages 363–378, Warsaw, Poland, April 2003 (with R. Alur and S. La Torre).
- [27] **Dynamic Message Sequence Charts.** *In Proc. 22nd Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS '02)*, volume 2556 of LNCS, pages 253–264, Kanpur, India, December 2002 (with M. Leucker and S. Mukhopadhyay).
- [28] **A Decidable Class of Asynchronous Distributed Controllers.** *In Proc. 13th Int'l Conf. on Concurrency Theory (CONCUR '02)*, volume 2421 of LNCS, pages 145–160, Brno, Czech Republic, 2002 (with P. S. Thiagarajan).
- [29] **Timed Control Synthesis for External Specifications.** *In Proc. 19th Annual Symposium on Theoretical Aspects of Computer Science (STACS '02)*, volume 2285 of LNCS, pages 571–582, Antibes - Juan les Pins, France, March 2002 (with D. D'Souza).
- [30] **Beyond Message Sequence Graphs.** *In Proc. 21st Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS '01)*, volume 2245 of LNCS, pages 256–267, Bangalore, India, December 2001 (with B. Meenakshi).
- [31] **Distributed Control and Synthesis for Local Specifications.** *In Proc. 28th Int'l Coll. on Automata, Languages and Programming (ICALP '01)*, volume 2076 of LNCS, pages 396–407, Crete, Greece, July 2001 (with P. S. Thiagarajan).
- [32] **Reasoning about Sequential and Branching Behaviours of Message Sequence Graphs.** *In Proc. 28th International Colloquium on Automata, Languages and Programming (ICALP '01)*, volume 2076 of LNCS, pages 809–820, Crete, Greece, July 2001.
- [33] **Open Systems in Reactive Environments: Control and Synthesis.** *In Proc. 11th International Conference on Concurrency Theory (CONCUR '00)*, volume 1877 of LNCS, pages 92–107, Penn. State Univ, USA, September 2000 (with O. Kupferman, P. S. Thiagarajan and M. Vardi).
- [34] **Controllers for Discrete Event Systems via Morphisms.** *In Proc. 9th International Conference on Concurrency Theory (CONCUR '98)*, volume 1466 of LNCS, pages 18–33, Nice, France, September 1998. (with P. S. Thiagarajan).

**JOURNAL
ARTICLES**

- [35] **Modular Strategies for Recursive Game Graphs.** *Invited to Special Issue for TACAS'03, Theoretical Computer Science*, volume 354(2):230–249 (with R. Alur and S. La Torre).
- [36] **Symbolic Computational Techniques for Solving Games.** *Invited; International Journal on Software Tools for Technology Transfer (STTT)*, volume 7(2):1433-2787, 2005 . (with W. Nam and R. Alur).
- [37] **Branching time controllers for discrete event systems.** *Theoretical Computer Science: CONCUR '98 Special Issue*, volume 274:1–2, 2002 (with P. S. Thiagarajan).
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