

# Muralidhar Talupur

---

## CONTACT INFORMATION

Computer Science Dept  
Carnegie Mellon University  
Pittsburgh, PA-15213

*Voice:* 412-268-3041  
*Fax:* 412-268-5576  
*E-mail:* tmurali@cs.cmu.edu

## STATUS

*Citizenship:* Indian

*Visa:* F1

## EDUCATION

**Carnegie Mellon University** Pittsburgh, PA  
Ph.D., Computer Science, **July 2006 (Expected)**

*Thesis Topic:* Abstraction Techniques for Parameterized Verification  
*Advisor:* Prof. Edmund Clarke

**Carnegie Mellon University** Pittsburgh, PA  
M.S, Computer Science, **December 2002**

*Advisor:* Prof. Edmund Clarke  
*GPA:* 4.00/4.00

**Indian Institute of Technology-Madras**, Chennai, India  
B.Tech, Computer Science, **June 1996 - June 2000**

*Thesis Topic:* Generative Power of Splicing Systems  
*Advisor:* Prof Kamala Krithivasan  
*GPA:* 8.72/10.00

## ACADEMIC DISTINCTIONS

Secured 35th rank in JEE-96, the entrance examination to the Indian Institutes of Technology, which was taken by over 100,000 students all over India.

Awarded fellowship by the School of Computer Science, Carnegie Mellon University.

Secured Merit Prize in State level Junior's Math Olympiad.

Solved a well known open problem in DNA computing as part of undergraduate thesis.

## RESEARCH EXPERIENCE

Worked on various aspects of Formal Verification including SAT based model checking, Predicate Abstraction, Counter Example Guided Abstraction Refinement techniques, Theorem Proving and published several papers in well known conferences.

Current projects:

- Efficient techniques for real time verification including a novel abstraction scheme for real time systems.
- A new abstraction technique for verifying Parameterized systems like Cache Coherence and Mutual Exclusion protocols.
- Decision procedures for fragments of first order logic.

Worked on automated test generation using modelcheckers during internship at NRL.

As an under-graduate, gave a new characterization for context free languages in terms of a well known splicing based system called  $EH(FIN, p[1])$  ( see Gh. Paun, G. Rozenberg, A. Salomaa, DNA Computing, Springer, 264-266).

INDUSTRIAL  
EXPERIENCE

**Naval Research Laboratory**, Washington, USA.  
*Summer Intern*

**Jun 03 - Aug 03**

Worked on automatic test generation from high level *SCR* specifications using model checkers. Studied the performance of various different model checkers in the test generation scenario.

**NEC Laboratories America**, Princeton, NJ

*Summer Intern*

**Jun 04 - Aug 04**

Worked on efficient decision procedures for a fragment of first order logic called *Separation Logic*. Devised a new algorithm for reducing the domains of variables while preserving satisfiability of separation logic formulas.

PROGRAMMING  
EXPERIENCE

Wrote a tool in Java which was over 12K lines of code as part of my thesis research in Formal Verification.

Implemented several modules of MINIBASE, an experimental database system, as a part of a course on Database management.

Implemented several novel Cache management algorithms during a course on Computer Architecture.

TEACHING  
EXPERIENCE

Teaching Assistant. Formal Languages, Automata and Combinatorics (15-453).  
Spring 2002, Carnegie Mellon University.

Teaching Assistant. Constructive Logic (15-399).  
Spring 2004, Carnegie Mellon University.

TOOLS

SMV, NuSMV, SPIN, PVS.

COMPUTER  
SKILLS

OS: Unix/Linux, Windows.  
Languages: C, C++, Java.

COURSE  
HIGHLIGHT

Formal Languages	Mathematical Logic
Algorithms	Graph Theory
Data Structures	Networking
Programming Languages	Compilers
Operating Systems	Machine Learning
Computer Architecture	Database Management

PUBLICATIONS

Muralidhar Talupur, Flavio Lerda, Edmund Clarke. *Filling In the Gaps: Efficient Techniques for Real Time Verification*. Submitted to International Conference on Computer Aided Verification (CAV) 2006.

Muralidhar Talupur, Helmut Veith, Edmund Clarke. *Environment Abstraction for Parameterized Verification*. In Proceedings of International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI) 2006.

Malay Ganai, Muralidhar Talupur, Aarti Gupta. *SDSAT: Tight Integration of Small Domain Encoding and Lazy approaches in a Separation Logic Solver*. In Proceedings of International Conference on Tools and Algorithms for Construction and Analysis of Systems(TACAS) 2006.

Edmund Clarke, Muralidhar Talupur, Tayssir Touilli, Helmut Veith. *Verification by Network Decomposition*. In International Conference on Concurrency Theory(CONCUR) 2004.

Muralidhar Talupur, Nishant Sinha, Ofer Strichman, Amir Pnueli. *Range Allocation for Separation Logic*. In Proceedings of International Conference on Computer Aided Verification(CAV) 2004.

Shuvendu Lahiri, Randy Bryant, Amit Goel, Muralidhar Talupur. *Revisiting Positive Equality* In Proceedings of International Conference on Tools and Algorithms for Construction and Analysis of Systems(TACAS) 2004.

Edmund Clarke, Orna Grumberg, Muralidhar Talupur, Dong Wang. *Making Predicate Abstraction Efficient: how to remove redundant predicates*. In Proceedings of International Conference on Computer Aided Verification(CAV) 2003.

Edmund Clarke, Orna Grumberg, Muralidhar Talupur, Dong Wang. *High Level Verification of Control Intensive Systems using Predicate Abstraction*. In International Conference on Formal Methods and Models for Codesign(MEMOCODE) 2003.

Edmund Clarke, Muralidhar Talupur, Helmut Veith, Dong Wang. *SAT based Predicate Abstraction for Hardware Verification* Appeared in International Conference on Theory and Applications of Satisfiability Testing(SAT) 2003.

Lakshminarayanan Subramanian, Muralidhar Talupur, Kamala Krithivasan, C. Pandu Rangan. *On the Generative Power of Simple H Systems*. Appeared in Journal of Automata, Languages and Combinatorics, Vol. 5, No. 4, 2000.

Prahlad Harsha, Muralidhar Talupur, Kamala Krithivasan *Simple Test Tube systems*. Presented in Graph Grammars 2000 and submitted to Journal of Automata, Languages and Combinatorics.

Muralidhar Talupur, Kamala Krithivasan. *The generative power of simple H system with permitting contexts*. Submitted to Theoretical Computer Science.

TECHINICAL  
REPORTS

Edmund Clarke, Muralidhar Talupur, Dong Wang. *SAT based Predicate Abstraction for Hardware Verification*. Technical Report CMU-ECE-CSSI 02-45, CMU, 2002.

Daniel Sleator, Muralidhar Talupur. *Optimal Binary Trees in Online Algorithms*. Technical Report CMU-CS-02-148, SCS, CMU, 2002.

UNDER  
PREPARATION

*Automatic Verification of Cache Coherence Protocols*. Edmund Clarke, Muralidhar Talupur, Helmut Veith. *In preparation*.

REFERENCES

Professor Edmund Clarke,  
Computer Science Department,  
Carnegie Mellon University  
*email:* emc@cs.cmu.edu

Professor Randy Bryant,  
Computer Science Department,  
Carnegie Mellon University  
*email:* bryant@cs.cmu.edu

Professor Amir Pnueli,  
Computer Science Department,  
New York University  
*email:* amir@cs.nyu.edu

Professor Jeannette Wing,  
Computer Science Department,  
Carnegie Mellon University  
*email:* wing@cs.cmu.edu

Others Available on Request