# Vinod Ganapathy

Curriculum Vitæ, October 24, 2007


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## 1 Research Interests

Computer Security and Reliability, Software Engineering, Program Analysis, Formal Methods.

## 2 Academic Appointments

- **Rutgers University**, New Brunswick, New Jersey, USA ..... September 2007 onwards
  Assistant Professor of Computer Science.

## 3 Education

- **University of Wisconsin**, Madison, Wisconsin, USA.
  - ***Ph.D. in Computer Science*** ..... August 2007
    Thesis: "Retrofitting Legacy Code for Authorization Policy Enforcement" [1]
    Advisor: Professor Somesh Jha.
    Minor degree: Mathematics (Algebra and Logic).
  - ***M.S. in Computer Science*** ..... May 2003
- **Indian Institute of Technology Bombay**, Mumbai, India.
  - ***B.Tech. in Computer Science & Engineering*** ..... August 2001
    Thesis: "Efficient Verification of Synchronous Programs" [2]
    Advisor: Professor S. Ramesh.

## 4 Previous Work Experience

- University of Wisconsin, Madison, Wisconsin, USA .....September 2001–August 2007
  Graduate Research Assistant
- IBM T.J. Watson Research Center, Hawthorne, New York, USA .....May 2005–August 2005
  Intern (Secure Systems Department)
- Microsoft Research, Redmond, Washington, USA .....May 2004–August 2004
  Intern (Runtime Analysis and Design Group)
- Indian Institute of Technology Bombay, Mumbai, India .....July 2000–May 2001
  Undergraduate Research Assistant
- Tata Institute of Fundamental Research, Mumbai, India .....May 2000–July 2000
  Intern (Visiting Students' Research Program)

# 5 Scientific Publications

Electronic copies of these papers are available at `http://www.cs.rutgers.edu/~vinodg/papers`

## Theses

[1] "Retrofitting Legacy Code for Authorization Policy Enforcement", Vinod Ganapathy, PhD dissertation, University of Wisconsin-Madison, Madison, Wisconsin, USA, August 2007.

[2] "Efficient Verification of Synchronous Programs", Vinod Ganapathy, Senior thesis, Indian Institute of Technology Bombay, Powai, Mumbai, May 2001.

## Refereed Conference Papers

[3] "The Design and Implementation of Microdrivers", Vinod Ganapathy, Matthew J. Renzelmann, Arini Balakrishnan, Michael M. Swift, and Somesh Jha, In *ASPLOS'08: Proceedings of the Thirteenth International Conference on Architectural Support for Programming Languages and Operating Systems*, Seattle, Washington, USA, March 2008, ACM Press, pages TBD.

[4] "Mining Security-Sensitive Operations in Legacy Code using Concept Analysis", Vinod Ganapathy, David King, Trent Jaeger, and Somesh Jha, In *ICSE'07: Proceedings of the 29$^{th}$ ACM/IEEE International Conference on Software Engineering*, Minneapolis, Minnesota, USA, May 2007, IEEE Computer Society Press, pages 458–467.

[5] "NetSpy: Automatic Generation of Spyware Signatures for NIDS", Hao Wang, Somesh Jha, and Vinod Ganapathy, In *ACSAC'06: Proceedings of the 22$^{nd}$ Annual Computer Security Applications Conference*, Miami Beach, Florida, USA, December 2006, IEEE Computer Society Press, pages 99–108.

[6] "HeapMD: Identifying Heap-based Bugs using Anomaly Detection", Trishul M. Chilimbi, and Vinod Ganapathy, In *ASPLOS'06: Proceedings of the Twelfth International Conference on Architectural Support for Programming Languages and Operating Systems*, San Jose, California, USA, October 2006, ACM Press, pages 219–228.

[7] "Retrofitting Legacy Code for Authorization Policy Enforcement", Vinod Ganapathy, Trent Jaeger, and Somesh Jha, In *IEEE S&P'06: Proceedings of the 2006 IEEE Symposium on Security and Privacy*, Berkeley/Oakland, California, USA, May 2006, IEEE Computer Society Press, pages 214–229.

[8] "Towards Automated Authorization Policy Enforcement", Vinod Ganapathy, Trent Jaeger, and Somesh Jha, In *SELinux'06: Proceedings of the Second Annual Security Enhanced Linux Symposium*, Baltimore, Maryland, USA, March 2006, pages 7–11.

[9] "An Auctioning Reputation System Based on Anomaly Detection", Shai Rubin, Mihai Christodorescu, Vinod Ganapathy, Jonathon T. Giffin, Louis Kruger, Hao Wang, and Nicholas Kidd, In *ACM CCS'05: Proceedings of the 12$^{th}$ ACM Conference on Computer and Communications Security*, Alexandria, Virginia, USA, November 2005, ACM Press, pages 270–279.

[10] "Automatic Placement of Authorization Hooks in the Linux Security Modules Framework", Vinod Ganapathy, Trent Jaeger, and Somesh Jha, In *ACM CCS'05: Proceedings of the 12$^{th}$ ACM Conference on Computer and Communications Security*, Alexandria, Virginia, USA, November 2005, ACM Press, pages 330–339.

[11] "Automatic Discovery of API-Level Exploits", Vinod Ganapathy, Sanjit A. Seshia, Somesh Jha, Thomas W. Reps, and Randal E. Bryant, In *ICSE'05: Proceedings of the 27$^{th}$ ACM/IEEE International Conference on Software Engineering*, St. Louis, Missouri, USA, May 2005, ACM Press, pages 312–321.

[12] "Buffer Overrun Detection using Linear Programming and Static Analysis", Vinod Ganapathy, Somesh Jha, David Chandler, David Melski, and David Vitek, In *ACM CCS'03: Proceedings of the 10$^{th}$ ACM Conference on Computer and Communications Security*, Washington, DC, USA, October 2003, ACM Press, pages 345–354.

## Refereed Workshop Papers

[13] "Microdrivers: A New Architecture for Device Drivers", Vinod Ganapathy, Arini Balakrishnan, Michael M. Swift, and Somesh Jha, In *HotOS'07: Proceedings of the 11$^{th}$ Workshop on Hot Topics in Operating Systems*, San Diego, California, USA, May 2007, USENIX Association, pages 85–90.

[14] "Slicing Synchronous Reactive Programs", Vinod Ganapathy, and S. Ramesh, vol. 65. In *Electronic Notes in Theoretical Computer Science (Proceedings of the 1$^{st}$ Workshop on Synchronous Languages, Applications and Programming, Grenoble, France)*, F. Maraninchi, A. Girault, and E. Rutten, editors, Elsevier Press, April 2002.

## Book Chapters

[15] "Analysis of COTS for Security Vulnerability Remediation", Gogul Balakrishnan, Mihai Christodorescu, Vinod Ganapathy, Jonathon T. Giffin, Shai Rubin, Hao Wang, Somesh Jha, Barton P. Miller, and Thomas Reps. In *Information Security Research: New Methods for Protecting against Cyber Threats*, C. Wang, S. King, R. Wachter, R. Herklotz, C. Arney, G. Toth, D. Hislop, S. Heise, and T. Combs, editors, Wiley Publishing Inc., July 2007.

## Patents

[16] "System for Automatic Detection of Spyware", Somesh Jha, Hao Wang, and Vinod Ganapathy, Patent Application filed with the United States Patent Office, November 29, 2006.

[17] "Heap-Based Bug Identification using Anomaly Detection", Trishul M. Chilimbi, and Vinod Ganapathy, Patent Application Number 20060265694, filed with the United States Patent Office, May 20, 2005.

# 6 Presentations

## Conference Presentations

- "Mining Security-Sensitive Operations in Legacy Code using Concept Analysis", $29^{th}$ International Conference on Software Engineering, Minneapolis, Minnesota, May 25, 2007.
- "Microdrivers: A New Architecture for Device Drivers", $11^{th}$ International Workshop on Hot Topics in Operating Systems, San Diego, California, May 8, 2007.
- "HeapMD: Identifying Heap-based Bugs using Anomaly Detection", Twelfth International Conference on Architectural Support for Programming Languages and Operating Systems, San Jose, California, October 24, 2006.
- "Retrofitting Legacy Code for Authorization Policy Enforcement", 2006 IEEE Symposium on Security and Privacy, Oakland, California, May 23, 2006.
- "Towards Automated Authorization Policy Enforcement", Second Annual Security-enhanced Linux Symposium, Baltimore, Maryland, March 1, 2006.
- "Automatic Placement of Authorization Hooks in the Linux Security Modules Framework", $12^{th}$ ACM Conference on Computer and Communications Security, Alexandria, Virginia, November 10, 2005.
- "Automatic Discovery of API-Level Exploits", $27^{th}$ International Conference on Software Engineering, St. Louis, Missouri, May 19, 2005.
- "Buffer Overrun Detection Using Linear Programming and Static Analysis", $10^{th}$ ACM Conference on Computer and Communications Security, Washington, DC, October 30, 2003.

## Invited Presentations

- "Retrofitting Legacy Code for Security",
  - IBM T.J. Watson Research Center, Hawthorne, New York, February 8, 2007.
  - CSE Dept., Pennsylvania State University, University Park, Pennsylvania, February 21, 2007.
  - CS Dept., Purdue University, West Lafayette, Indiana, February 26, 2007.
  - Microsoft Research India, Bangalore, India, March 22, 2007.
  - CS Dept., North Carolina State University, Raleigh, North Carolina, March 30, 2007.
  - CS Dept., Rutgers University, New Brunswick, New Jersey, April 10, 2007.
  - DIMACS Mixer Series, Bell Labs, Murray Hill, New Jersey, October 23, 2007.

## Other Presentations to the Research Community

- "Retrofitting Legacy Code for Authorization Policy Enforcement",
  - Ph.D. thesis defense, Madison, Wisconsin, July 12, 2007.
  - IBM Research India, Bangalore, India, July 7, 2006.
  - Google Inc., Bangalore, India, June 28, 2006.
  - CSA Dept., Indian Institute of Science, Bangalore, India, June 19, 2006.
  - Microsoft Research India, Bangalore, India, June 15, 2006.

  - First Midwest Security Workshop, Chicago, Illinois, May 6, 2006.
- "Creating and Operating Security-Aware Code", Ph.D. Thesis Proposal, Computer Sciences Department, University of Wisconsin, Madison, Wisconsin, January 20, 2006.
- "Enabling Application-Level Authorization Policy Enforcement", IBM T.J. Watson Research Center, Hawthorne, New York, August 25, 2005.
- "Automatic Placement of Authorization Hooks in the Linux Security Modules Framework", IBM T.J. Watson Research Center, Hawthorne, New York, August 3, 2005.

### Presentations to Funding Agencies

- "Automatic Discovery of API-Level Exploits", ONR MURI Workshop, Arlington, Virginia, February 14, 2005.
- "Buffer Overrun Detection Using Linear Programming and Static Analysis",
  - ONR MURI Workshop, Pittsburgh, Pennsylvania, July 23, 2003.
  - ONR MURI Workshop, Williamsburg, Virginia, January 28, 2003.
  - ONR MURI Workshop, Harpers Ferry, West Virginia, July 12, 2002.
  - ONR MURI Workshop, Washington, DC, January 15, 2002.
  - ONR Site Visit, Madison, Wisconsin, November 10, 2001.

## 7 Teaching and Advising Experience

### Teaching at Rutgers University

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| Fall 2007 | *Introduction to Software Security* (16:198:673:01). Advanced graduate course on computer security with a focus on state-of-the-art techniques in software security. |
| Fall 2007 | *Systems, Networking, and Security Isues in Mobile Personal Computing* (16:198:500:01). Light seminar on systems and security issues in emerging computing platforms such as cellular phones and vehicular networks. Co-taught with Liviu Iftode. |

### Experience at University of Wisconsin, Madison

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| Spring 2003–Spring 2007 | *Introduction to Information Security* (CS642). Reviewed, graded and mentored projects in this upper-division undergraduate course on computer security. |
| Fall 2002 | *Analysis of Software Artifacts* (CS706). Guest lectures on buffer overrun vulnerabilities—exploits and defenses. |

### Ph.D. Qualifying Exam/Dissertation Committees

Stephen Smaldone (CS, Rutgers University, September 2007).

# 8 Professional Activities

### Conference Program Committees

- $15^{th}$ ACM Conference on Computer and Communications Security, Alexandria, Virginia, October 2008.
- $2^{nd}$ IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (Reliable Software Systems track), Taichung, Taiwan, June 11-13, 2008.
- $15^{th}$ Annual Networked and Distributed Systems Security Symposium, San Diego, California, February 11-13, 2008.

### Reviewing

- *Journals:* Journal of Computer Security (JCS), ACM Transactions on Internet Technology (TOIT).
- *Conferences:* IEEE Symposium on Security and Privacy (2007), ACM Conference on Computer and Communications Security (2005, 2006, 2007), USENIX Security Symposium (2005, 2006), ISOC Symposium on Networked and Distributed Systems Security (2005, 2007), USENIX Annual Technical Conference (2004), International Symposium on High-Performance Computer Architecture (2008), International World Wide Web Conference (2004, 2005), International Conference on Computer-Aided Verification (2005, 2006), International Conference on Tools and Algorithms for the Construction and Analysis of Systems (2007), ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (2008), ACM SIGSOFT International Symposium on Software Testing and Analysis (2004), Formal Methods and Models for Codesign (2004).
- *Workshops:* Workshop on Software Engineering for Secure Systems (2005).

### University and Departmental Service

- Incoming graduate student transition committee (constituted by students' chapter of the ACM); University of Wisconsin, Madison (2002).

### Collaboration with Industry

- Technology transfer to Grammatech Inc., Ithaca, New York. Lead the design, implementation and evaluation of a buffer overrun detection tool using CodeSurfer$^{tm}$ (September 2001–August 2003).

# 9 Academic Achievements

- Visiting Students' Research Scholarship, awarded by Tata Institute of Fundamental Research, Mumbai (May 2000).

# 10 Personal Information

- **Citizenship:** Republic of India.

- **Visa status:** United States H-1B.
- **Birth Date and Place:** September 1979, Bangalore, India.