

# Richard P. Martin

## Curriculum Vitae

November, 2006

Department of Computer Science  
Rutgers University  
New Brunswick, NJ 08901

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**Current Position** Associate Professor  
Rutgers University Department of Computer Science

Birthplace: San Juan, PR.  
Citizenship: USA

<b>Education</b>	<b>University of California at Berkeley</b>	<b>1999</b>
	Ph.D. in Computer Science	
	<b>University of California at Berkeley</b>	<b>1996</b>
	M.S. in Computer Science	
	<b>Rutgers University</b>	<b>1992</b>
	B.A. in Computer Science	

<b>Employment</b>	<b>Rutgers University</b>	<b>New Brunswick, NJ</b>
7/06 — present	Associate Professor, Department of Computer Science.	
	<b>WINLAB, Rutgers University</b>	<b>Piscataway, NJ</b>
6/05 — present	Research Faculty.	
	<b>Rutgers University</b>	<b>New Brunswick, NJ</b>
9/99 — 07/06	Assistant Professor, Department of Computer Science.	
	<b>Teoma Technologies</b>	<b>Piscataway, NJ</b>
01/01 — 06/01	Lead Architect (on leave from Rutgers).	
	<b>University of California at Berkeley</b>	<b>Berkeley, CA</b>
4/99 — 8/99	Post-Doctoral Researcher, Computer Science Division, Dept. of Electrical Engineering and Computer Science.	
	<b>University of California at Berkeley</b>	<b>Berkeley, CA</b>
6/93 — 3/99	Graduate Student Researcher, Computer Science Division, Dept. of Electrical Engineering and Computer Science.	
	<b>Icore Technologies Inc.</b>	<b>Oakland, CA</b>
2/98 — 6/98	Consultant.	
	<b>Inktomi Corp.</b>	<b>San Mateo, CA</b>
1/97 — 4/97	Consultant.	

6/92 — 8/92  
6-91 — 8-91  
6-90 — 8/90

**Bell Communications Research**  
Intern, Computer Technology Transfer division.

**Piscataway, NJ**

## Honors and Awards

**NSF Faculty Early Career Development (CAREER) Award** **2005-2010**  
*Unified Probabilistic Localization for Sensor Networks: Theoretic and Practical Foundations.*

**Best Paper Award** **October 2004**  
IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON)  
*The Limits of Localization Using Signal Strength: A Comparative Study.*

**Phi Beta Kappa** **May 1991**

## Publications

*Refereed  
Conferences*

Y. Chen, J. A. Francisco, Wade Trappe, R. P. Martin, *A Practical Approach to Landmark Deployment for Indoor Localization*, The IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), September, 2006.

K. Kleisouris, R. Martin, *Reducing the Computational Cost of Bayesian Indoor Positioning Systems*, The IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), September, 2006.

Y. Chen, K. Kleisouris, Xi. Li, W. Trappe, R. P. Martin, *The Robustness of Localization Algorithms to Signal Strength Attacks: A Comparative Study*, Distributed Computing in Sensor Systems (DCOSS), June, 2006.

F. Oliveira, K. Nagaraja, R. Bachwani, R. Bianchini, R. P. Martin, T. D. Nguyen, *Understanding and Validating Database System Administration*, Usenix Technical Conference, May, 2006.

X. Li, R. Martin, *A Simple Ray-Sector Signal Strength Model for Indoor 802.11 Networks*, To appear in Proceedings of the 2nd IEEE International Conference on Mobile Ad-Hoc and Sensor Systems (MASS), November, 2005.

D. Madigan, E. Elnahrawy, R. P. Martin, W. Ju, P. Krishnan, A. S. Krishnakumar, *Bayesian Indoor Positioning Systems*, In Proceedings of the 24th joint conference of the IEEE Computer and Communication Societies (INFOCOM), March 2005.

K. Nagaraja, F. Olivera, R. Bianchini, R. P. Martin, T. D. Nguyen, *Understanding and Dealing with Operator Mistakes in Internet Services*, In Proceedings of the 6th Symposium on Operating Systems Design and Implementation (OSDI), December, 2004.

### **Winner: Best Paper Award.**

E. Elnahrawy, X. Li, R. P. Martin, *The Limits of Localization Using Signal Strength: A Comparative Study*, In Proceedings of the IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), October, 2004.

X. Li, T. D. Nguyen, R. P. Martin, *Using Adaptive Range Control to Maximize 1 Hop Broadcast Coverage in Dense Wireless Networks*, In Proceedings of the IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), October, 2004.

G. M. C. Gama, K. Nagaraja, R. Bianchini, R. P. Martin, W. Meira Jr., T. D. Nguyen, *State Maintenance and its Impact on the Performability of Multi-tiered Internet Services*, In Proceedings of the 23rd International Symposium on Reliable Distributed Systems (SRDS), October, 2004.

- X. Li, T. D. Nguyen, R. P. Martin, *An Analytic Model Predicting the Optimal Range for Maximizing 1-Hop Broadcast Coverage in Dense Wireless Networks*, In Proceedings of the 3rd International Conference on AD-HOC Networks & Wireless (AdHoc NOW), July 2004.
- F. M. Cuenca-Acuna, R. P. Martin, T. D. Nguyen, *Autonomous Replication for High Availability in Unstructured P2P Systems*, In Proceedings of the IEEE Symposium on Reliable Distributed Systems (SRDS), October 2003.
- C. Fu, R. P. Martin, K. Nagaraja, T. D. Nguyen, B. G. Ryder, D. Wonnacott, *Compiler-directed Program-fault Coverage for Highly Available Java Internet Services*, In Proceedings of IEEE Dependable Systems and Networks (DSN), June 2003.
- F. M. Cuenca-Acuna, C. Peery, R. P. Martin, T. D. Nguyen, *PlanetP: Using Gossiping to Build Content Addressable Peer-to-Peer Information Sharing Communities*, In Proceedings of the 12th International Symposium on High Performance Distributed Computing (HPDC), June 2003.
- K. Nagaraja, X. Li, R. Bianchini, R. P. Martin, T. D. Nguyen, *Using Fault Injection and Modeling to Evaluate the Performability of Cluster-Based Services*, Proceedings of the 4th USENIX Symposium on Internet Technologies and Systems (USITS-4), March 2003.
- K. Nagaraja, N. Krishnan, R. Bianchini, R. P. Martin, T. D. Nguyen, *Evaluating the Impact of Communication Architecture on the Performability of Cluster-Based Services*, In Proceedings of the IEEE 9th International Symposium on High Performance Computer Architecture (HPCA-9), February 2003.
- T. Heath, R. P. Martin, T. D. Nguyen, *Improving Cluster Availability Using Workstation Validation*, In Proceedings of the ACM SIGMETRICS 2002, June 2002.
- T. Heath, S. Kaur, R. P. Martin and T. D. Nguyen, *Quantifying the Impact of Architectural Scaling on Communication*, Proceedings of the IEEE 7th International Symposium on High Performance Computer Architecture (HPCA-7), January 2001.
- F. C. B. Wong, R. P. Martin, R. Arpaci-Dusseau, and D. Culler, *Architectural Requirements and Scalability of the NAS Parallel Benchmarks*, in Proc. of SC99 Conference on High Performance Networking and Computing, November 1999.
- R. P. Martin, and D. Culler *NFS Sensitivity to High Performance Networks*, in Proc. 1999 ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems, May 1999.
- R. Wang, A. Krishnamurthy, R. P. Martin, D. E. Culler and T. E. Anderson, *Modeling Communication Pipeline Latency*, In Proceedings of the ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems, June 1998.
- D. Culler, L. T. Liu, R. P. Martin, C. Yoshikawa, *LogP Performance Assessment of Fast Network Interfaces*, IEEE Micro, Feb. 1996 (presented at Hot Interconnects III), August 1995. (award paper).
- R. P. Martin, *HPAM: An Active Message Layer for a Network of HP Workstations*, In Hot Interconnects II, Aug. 1994.
- R. P. Martin, A. M. Vahdat, D. E. Culler, and T. E. Anderson, *Effects of Communication Latency, Overhead, and Bandwidth in a Cluster Architecture*, In Proceedings of the 24th Annual International Symposium on Computer Architecture (ISCA), June 1997.
- Journal Articles* A. C. Dusseau, D. E. Culler and K. E. Schauer, R. P. Martin, *Fast Parallel Sorting under LogP: Experiences with the CM-5*, IEEE Transactions of Parallel and Distributed Systems, vol. 7, no. 8, Aug. 1996.

K. Nagaraja, G. M. C. Gama, R. Bianchini, R. P. Martin, W. Meira Jr., T. D. Nguyen, *Quantifying the Performability of Cluster-Based Services*, IEEE Transactions on Parallel and Distributed Systems, vol. 15, no. 5, May 2005.

*Refereed  
Workshops*

A. Tjang, F. Oliveira, R. P. Martin, T. D. Nguyen, *A : An Assertion Language for Distributed Systems*, Workshop on Linguistic Support for Modern Operating Systems, (PLOS) October, 2006.

R. Bianchini, R. P. Martin, K. Nagaraja, T. D. Nguyen, F. Oliveira, *Human-Aware Computer System Design*, In Proceedings of the 10th Workshop on Hot Topics in Operating Systems (HotOS), Santa Fe, NM, June 2005.

C. Peery, F. M. Cuenca-Acuna, R. P. Martin, T. D. Nguyen, *Wayfinder: Navigating and Sharing Information in a Decentralized World*, Second International Workshop on Databases, Information Systems, and Peer-to-Peer Computing (DBISP2P), Toronto, Canada, August, 2004.

E. Elnahrawy, X. Li, R. P. Martin, *Using Area-based Presentations and Metrics for Localization Systems in Wireless LANs*, The 4th IEEE Workshop on Wireless Local Networks (WLAN), Tampa, FL, November, 2004.

A. Tjang, M. Pagliorola, H. Patel, X. Li, R. P. Martin, *Active Tapes: Bus-Based Sensor Networks*, The First IEEE Workshop on Embedded Networked Sensors (EmNetS-I), Tampa, FL, November, 2004.

K. Nagaraja, R. Bianchini, R. P. Martin, T. D. Nguyen, *Using Fault Model Enforcement to Improve Availability*, In Proceedings of the Second Workshop on Evaluating and Architecting System dependability (EASY-II), San Jose, CA, October, 2002.

X. Li, R. P. Martin, K. Nagaraja, T. D. Nguyen, B. Zhang, *Mendokus: A SAN-based Fault-Injection Test-Bed for the Construction of Highly Available Network Services*, In Proceedings of the First Workshop on Novel Uses of System Area Networks (SAN-1), Cambridge, MA, February 2002.

T. Heath, R. P. Martin, T. D. Nguyen, *The Shape of Failure*, In Proceedings of the First Workshop on Evaluating and Architecting System dependability (EASY-1), Gothenburg, Sweden, July 2001.

R. P. Martin, K. Nagaraja, T. D. Nguyen, *Using Distributed data Structures for Constructing Cluster-Based Services*, In Proceedings of the First Workshop on Evaluating and Architecting System dependability (EASY), Gothenburg, Sweden, July 2001.

M. E. Fiuczynski, R. P. Martin, T. Owa, B. N. Bershad, *SPINE: a safe programmable and integrated network environment*, ACM SIGOPS European Workshop, Sintra, Portugal, September 1998.

M. E. Fiuczynski, R. P. Martin, T. Owa, B. N. Bershad, *On Using Intelligent Network Interface Cards to support Multimedia Applications*, 8th International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV 98), Cambridge, UK, July 1998.

*Technical  
Reports*

Ankur Choksi and Richard P. Martin and Badri Nath and Rahul Pupala, *Mobility Support for Diffusion-based Ad-Hoc Sensor Networks*. Rutgers Department of Computer Science Technical Report DCS-TR-463, April 2002.

**Grant Support**

2006-2009

A Geometric Stack for Location-Aware Networking. Total: \$400,000. Supported by NSF CNS award 0627032. PI: Marco Gruteser. Co-PI: R. Martin.

- 2005-2010 Unified Probabilistic Localization for Sensor Networks: Theoretic and Practical Foundations (CAREER award). Total \$549,298. Supported by NSF CNS award 0448062. PI: R. P. Martin.
- 2005-2008 Guiding and Validating Operator Behavior in Internet Services. Total \$797,145.00 Supported by NSF 0509007. PI: T. D. Nguyen. Co-PI's: R. Bianchini, R. P. Martin.
- 2001-2004 System and Compiler Support for Component-Based Construction of Scalable Internet Services. Total \$505,857. Supported by NSF Next General Software contract 0103722. PI: T. D. Nguyen. Co-PI's: R. Martin, B. G. Ryder.
- 2000-2003 Webdust: Automated construction and maintenance of spatially constrained information in pervasive microsensor networks Total \$1,500,000 (774,096 optional). Supported by DARPA contract N66001-00-1-8953. PI: B. Nath. Co-PI's: T. Imielinski, R. P. Martin, B. Vickers.
- 2001-2002 IBM Support for University Research Equipment Grant. Total \$53,038. Supported by IBM T.J. Watson Research Center. PI: B. Ryder. Co-PI's: B. Ryder, U. Kremer, R. P. Martin, T. D. Nguyen, D. Smith, and M. Hinds (IBM).
- 2000-2002 System support for Scalable, Fault Tolerant Computing and Services on PC Clusters. Total \$216,775. Supported by NSF CISE Research and Instrumentation Program (CISE-9986046) for \$144,510 with \$72,265 matching from the Office of the University Vice-President for Academic Affairs and FAS. PI: Thu Nguyen. Co-PIs: R. Bianchini, L. Iftode and R. Martin.
- 2000 Digital Sprinklers: Realizing Scalable and Location-Dependent Information Services. Total: \$50,000. Supported by Cisco corp. PIs: B. Nath. T. Imielinski, R. Martin, B. Vickers.

**Public  
Research  
and Transfers**

- GRAIL Localization System** **2006**  
Publicly available software for localizing 802.11 and 802.15.4 devices in indoor environments. The software and documentation are available at: <http://www.panic-lab.cs.rutgers.edu/Research/GRAIL/index.htm>
- Human Factors Data** **2004**  
Publicly available data on human factor experiments examining operations tasks, including experiment setup and mistake information.  
[http://vivo.cs.rutgers.edu/op\\_results/](http://vivo.cs.rutgers.edu/op_results/)
- Mendosus Fault Injection System** **2002**  
Fault injection and network emulation software for performing system-level fault experiments. Transferred to the Berkeley ROC group.  
<http://vivo.cs.rutgers.edu/mendosus.html>
- Active Messages** **1996**  
Active Message communication software was transferred to the Inktomi search engine.  
[http://now.cs.berkeley.edu/AM/lam\\_release.html](http://now.cs.berkeley.edu/AM/lam_release.html)

**Invited Talks**

- University of Virginia** **July 2005**  
Title: Bayesian Localization using Angle of Arrival.

	<b>Yale University</b>	<b>February 2004</b>
	Title: The Limits of Localization Using Signal Strength.	
	<b>Comrise, Hazlet, NJ</b>	<b>August 2004</b>
	Title: Web Services, Hope or Hype?	
	<b>Intel Research, Berkeley</b>	<b>April 2002</b>
	Title: A Spatial Web Overview.	
	<b>University of California at Berkeley</b>	<b>April 2002</b>
	Title: Mendosus: A SAN-based Fault Injection System.	
<b>Supervised Research</b>		
<i>PhD Graduates</i>	<b>Xiaoyan Li</b>	<b>2002 - 2006</b>
	Thesis Title: Characterizing and Accommodating Spatial Aspects of Wireless Networks. Ph.D. Awarded from Rutgers University, October 2006.	
	<b>Eiman Elnahrawy</b>	<b>2003 - 2006</b>
	Thesis Title: Indoor Localization Using Signal Strength. Ph.D. Awarded from Rutgers University, October 2006.	
<i>PhD Students Advised</i>	<b>Andrew Tjang</b>	<b>2003 - present</b>
	Current Research: Assertion Languages for Highly Available Systems.	
	<b>Konstantinos Kleisouris</b>	<b>2004 - present</b>
	Current Research: Modeling Multiple Personal Device Usage. Passed qualifying exam August 2004.	
	<b>Yingying Chen</b>	<b>2005 - present</b>
	Current Research: Localization System Security.	
<i>Masters Students Advised</i>	<b>Melalite Ayenew</b>	<b>Spring 2005</b>
	Essay Title: Signal Modeling for Directional Antennas.	
	<b>Himanshu Gupta</b>	<b>Spring 2005</b>
	Essay Title: Copyright in the Digital Age.	
	<b>Nandini Shenoy</b>	<b>Sept.- May 2003</b>
	Thesis title: Using Trajectory Based Forwarding for resource discovery in diffusion protocols.	
	<b>Samian Kaur</b>	<b>Sept. - May 2000</b>
	Thesis title: <i>Peformability Modeling and Analysis of Fault Tolerance Support in Com munication Protocols.</i> (Co-advised with Thu Nguyen)	
<i>PhD Thesis Committees</i>	<b>Kiran Nagaraja</b>	<b>June 2005</b>
	Title: A Systematic Approach to Quantifying and Improving the Availability of Cluster-Based Internet Services Examining Committee: Thu Nguyen (Chair), Richard Martin, Ricardo Bianchini, Kimberly Keeton (HP labs, Palo Alto)	

- Samir Goel** **May 2005**  
 Title: Etiquette protocol for ultra low power operation in energy constrained networks.  
 Examining Committee: Tomasz Imielinski (Chair), Richard Martin, Roy Yates, Badri Nath.
- Francisco Matias Cuenca-Acuna** **April 2004**  
 Title: A Probabilistic Approach to Building Large Scale Federated Systems.  
 Examining Committee: Thu Nguyen (chair), Ricardo Bianchini, Richard Martin. Craig Neville-Manning (Google)
- Sudeept Bhatnagar** **April 2004**  
 Title: Distributed Admission Control in Core-Stateless Networks.  
 Examining Committee: Badri Nath (chair), Richard Martin, Thu Nguyen Arup Acharya (IBM T.J. Watson Research Center).
- Dragos Niculescu** **March 2004**  
 Title: Forwarding and Positioning Problems in Ad Hoc Networks.  
 Defense Committee: Badri Nath (chair), Muthu Muthukrishnan, Richard Martin, Arup Acharya (IBM Research).
- Samrat Ganguly** **May 2003**  
 Title: Dynamic QoS Provisioning in Cellular Networks.  
 Examining Committee: Badri Nath (Chair), Brett Vickers, Rich Martin, Michael Fredman
- Matthew Arnold** **September 2002**  
 Title: Online Profiling and Feedback-Directed Optimization of Java.  
 Examining Committee: Barbara G. Ryder (Chair), Richard Martin, Donald Smith, Michael Hind (IBM TJ Watson Research Center) and Craig Chambers (University of Washington)
- Safiullah Faizullah** **December 2001**  
 Title: Measuring and Pricing the Delivered QoS-enabled Internetworks.  
 Examining Committee: Saul Levy (Chair), Ivan Marsic, Thu Nguyen, Richard Martin, Mohsen Guizani (University of W. Florida)
- Undergraduate Research* **Ting Zhang** **Spring 2004**  
 Project: Localization based on RSSI and Angle.
- Stanislav Belenitsky** **Spring 2003**  
 Project: Automatic Fault Detection and System Recovery.
- Marc Montgomery** **Spring 2003**  
 Project: Fault Model Enforcement In Internet Services.
- Ting Zhang** **Spring 2003**  
 Project: Quantification of Spatial Object Density.
- Craig Lichtenstein** **Spring 2003**  
 Project: Observing Abnormal System Call Behavior in the Linux Kernel.
- Kevin George** **Fall 2000**  
 Project: Minimal Sizing of Linux Systems.
- Janine Perret** **Spring 2000**  
 Project: Multi-threaded failover.

## Courses

- Graduate Seminars* Pro-Seminar on Compilers, Operating Systems and Networks, Spring 2002, Spring 2004.  
Seminar: Localization System and Location-based Services, Fall 2003, Spring 2005.  
Seminar: Scalable Internet Services, Fall 2000.  
Seminar: Federated Architectures, Fall 1999.
- Graduate Courses* Computer Networks (CS 552), Fall 2005, Fall 2004  
Design of Internet Services (CS 553), Spring 2002, Spring 2003, Spring 2004.
- Undergraduate Courses* Internet Technology/Computer Networks (CS 352), Fall 2000, Spring 2000, Fall 2001, Fall 2002, Fall 2003, Spring 2004, Spring 2005.  
Operating Systems (CS 416) Fall 2001.

## Professional Service

- Journal Reviewer* Mobile Computing and Communications Review, 2004-2005.
- Program Committee Member* The 3rd International Service Availability Symposium (ISAS), 2006.  
The 2nd IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), 2005.  
The 1st IEEE Conference on Sensor and Ad Hoc Communication Networks (SECON), 2004.  
The 1st ACM Conference on Embedded Networked Sensor Systems (SENSYS), 2003.  
The 2nd Workshop on Evaluating and Architecting System dependability (EASY-II), 2002.  
The 1st Workshop on Evaluating and Architecting System dependability (EASY), 2001.
- Program Chair* The 2nd NYC Metropolitan Area Distributed Systems Workshop (NMADS-2) (with R. Bianchini), 2000.
- Conference Reviewer* International Symposium on Computer Architecture (ISCA), 2003  
High Performance Computer Architecture (HPCA-9), 2003
- Steering Committee* The 3rd NYC Metropolitan Area Distributed Systems Workshop (NMADS-3), 2001.  
The 1st NYC Metropolitan Area Distributed Systems Workshop (NMADS-1), 2000.

## Department Service

- Office of Sponsored Research Projects NSF CAREER panel, 2005  
Hiring Committee, AY 2004-5  
Graduate Admissions AY 2001-2, AY 2003-4  
Faculty Adviser, Undergraduate Student Alliance of Computer Scientists (USACS), 2002-2005.  
Faculty Co-Adviser, Women In Computer Science (WCS), 2001-2005 (with Barbara Ryder).

## Professional Societies

- IEEE (Computer Society), ACM, USENIX.