

# Sasikanth Avancha

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## SUMMARY

- Innovative researcher with over 5 years of experience in protocol design for distributed systems and large-scale wireless network simulation. Accomplishments in wireless networking and mobile computing with emphasis on sensor networks, security, service discovery and management, routing and transport protocols. Designed creative solutions to problems in wireless ad-hoc and sensor networks using Semantic Web technologies.
- Strong record of publication with over 15 publications in peer-reviewed journals and refereed conferences. Co-authored book chapters on wireless sensor network security and mobile computing.
- Co-inventor on patent application for novel technique to determine location of indoor wireless clients.
- Participated in development of grant proposals to National Science Foundation on sensor networks for homeland security.
- Over 3 years of industrial experience in software engineering. Task delegation to team members for efficient use of resources to enable speedy defect resolution for customers. Experience in working with global team members and clients.

## EDUCATION

Ph.D., Computer Science, (Expected Graduation Date: August 2005)

University of Maryland, Baltimore County

Dissertation: **A Holistic Approach to Secure Sensor Networks**

Advisor: Dr. Anupam Joshi

M.S., Computer Science, 2002

University of Maryland, Baltimore County

Thesis: **Enhancing the Bluetooth Service Discovery Protocol**

Advisor: Dr. Anupam Joshi

B.E., Computer Science & Engineering, 1994

UVCE, Bangalore University, Bangalore

Project title (software): **Spoken Word Recognition using Neural Networks**

Project title (hardware): **Embedded-controller based Network for Instrumentation Applications**

## EMPLOYMENT HISTORY

Graduate Research Assistant	Aug. 2002 – Present
<b>Department of CS &amp; EE, University of Maryland, Baltimore County</b>	Aug. 2000 – Feb. 2002
Graduate Intern	Feb. 2002 – May 2002
<b>Fujitsu Laboratories of America, College Park, MD</b>	
Graduate Research Assistant	Aug. 1999 – Aug. 2000
<b>Diagnostic Radiology, University of Maryland Medical School</b>	
Senior Software Engineer	Sep. 1997 – Aug. 1999
<b>Peritus Software Services, Westborough, MA</b>	
Systems Engineer	Feb. 1996 – Sep. 1997
<b>BFL Software Limited, Bangalore, India</b>	
Project Assistant, Supercomputer Education and Research Center	Nov. 1994 – Feb. 1996
<b>Indian Institute of Science, Bangalore, India</b>	

## WORK & RESEARCH EXPERIENCE

### **Graduate Research Assistant**

**Department of CS & EE, University of Maryland, Baltimore County**

**Aug. 2002 – Present**

- Designed and simulated novel, ontological framework to enable design of secure and adaptive wireless sensor networks that can detect, analyze and react to changes in their environment.
- Designed and simulated a novel secure topology discovery protocol for wireless sensor networks.
- Implemented and simulated centralized security protocol for wireless sensor networks used in perimeter protection applications.
- Participated in developing a grant proposal to NSF on “*A Holistic Approach to Secure Sensor Networks*”, which received *competitive* rank. Responsible for developing core idea of sensor network adaptability based on prevailing environmental and security conditions.
- Analyzed database systems used by Maryland Department of Health and Mental Hygiene (DHMH) for disease surveillance and reporting. Developed recommendations for DHMH officials to enable compliance of databases with Center for Disease Control’s (CDC) National Electronic Disease Surveillance System.

### **Graduate Intern**

**Fujitsu Laboratories of America, College Park, MD**

**Feb. 2002 – May 2002**

- Collaborated with team members to design, implement and demonstrate novel, patent-pending indoor client-location-determination technique for IEEE 802.11b enabled devices in an environment consisting of multiple IEEE 802.11b base stations functioning as mini-beacons.
- Implemented step-by-step procedure to enable Compaq iPaq to function as an IEEE 802.11b base station to demonstrate location-determination technique.
- Analyzed Microsoft’s Universal Plug and Play specification for service discovery in wireless home networking environment and suggested modifications to improve service discovery by employing semantic matching techniques in addition to syntactic matching.

### **Graduate Research Assistant**

**Department of CS & EE, University of Maryland, Baltimore County**

**Aug. 2000 – Feb. 2002**

- Analyzed performance of TCP/IP stack and CentaurusComm, a protocol developed in-house, for deployment in wireless environments.
- Designed and implemented enhancements to Bluetooth technology to enable semantic service discovery using Prolog reasoning engine and knowledge base. Conducted experiments to validate performance of enhancements on lightweight devices.

### **Graduate Research Assistant**

**Diagnostic Radiology, University of Maryland Medical School**

**Aug. 1999 – Aug. 2000**

- Implemented Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) based Decoupled Automated Rotation and Translation (DART) algorithm for MRI image registration. Evaluated performance of algorithms on a stand-alone system.
- Implemented MRI image registration algorithms on parallel processing system consisting of networked Apple G3 computers using MPI and evaluated performance of algorithms on system.

**Senior Software Engineer**  
**Westborough, MA**

**Peritus Software Services, Inc.**  
**Sep. 1997 – Aug. 1999**

- Performed source code analysis required to correct defects in DG/UX (Data General variant of AT&T SVR4 UNIX), FTX (Stratus, Inc. variant of AT&T SVR4 UNIX) and Stratus VOS operating systems. Corrected defects in all components of operating systems. Specialized in correcting defects in network component.
- Responsible for task assignment to team. Assigned incoming tasks to team members based on their skill set and workload to ensure speedy resolution of defects for customers and efficient functioning of team. Directly interacted with global customers and resolved high priority, emergency issues.

**Systems Engineer**  
**Bangalore, India**

**BFL Software Limited**  
**Feb. 1996 – Sep. 1997**

- Responsible for analyzing and re-engineering defective code in FTX operating system. Collaborated with extended team members at Peritus Software Services, Inc. based in Westborough, MA.
- Functioned as primary contact between Bangalore and Westborough teams to ensure proper distribution of workload between the two teams based on skill sets of local and remote team members.

**Project Assistant**  
**Indian Institute of Science, Bangalore, India**

**Supercomputer Education and Research Center**  
**Nov. 1994 – Feb. 1996**

- Developed and tested software for low-cost text-to-speech conversion kit to enable visually impaired persons use computers. Conducted a workshop in Bhopal, India to train visually impaired people to use kit.
- Researched issues on robust task execution in distributed systems. Designed and developed fault-injection techniques to study effect of faults on task execution in network of VAX-11 systems.

## COMPUTER SKILLS

Programming Languages and Tools: C, C++, Java, Prolog, XSB, Expect, Perl, MPI  
Operating Systems: UNIX, Linux, DG/UX, FTX, Stratus VOS  
Network Technologies: TCP/IP, Mobile IP, Bluetooth, IEEE 802.11b  
Network Simulators: NS-2, SENSE, J-Sim  
Semantic Web Languages: RDF/RDFS, DAML+OIL, OWL

## PATENTS

1. R. Masuoka, J. Agre, S. Avancha and S. Thakkar, **A Method and Apparatus for Location Determination Using Mini-Beacons**, Fujitsu Laboratories of America, Inc., (application pending as of February 2005).

## PUBLICATIONS

### BOOK CHAPTERS

1. S. Avancha, J. Undercoffer, A. Joshi and J. Pinkston, **Security for Wireless Sensor Networks**, Chapter 12 in *Wireless Sensor Networks* (C. S. Raghavendra, K. M. Sivalingam and T. Znati eds.), May 2004.
2. S. Avancha, D. Chakraborty, F. Perich and A. Joshi, **Data and Services for Mobile Computing**, *Practical Handbook of Internet Computing*, (Munindar Singh ed.), CRC Press, November 2004.

#### REFEREED JOURNALS

3. S. Avancha, J. Undercoffer, A. Joshi and J. Pinkston, **Secure Sensor Networks for Perimeter Protection**, Computer Networks (Elsevier), Vol. 43, No. 4, November 2003.
4. S. Avancha, P. D'Souza, F. Perich, A. Joshi and Y. Yesha, **P2P M-Commerce in Pervasive Environments**, ACM SIGecom Exchanges, Vol. 3, No. 4, January 2003.
5. S. Avancha, V. Korolev, A. Joshi, T. Finin and Y. Yesha, **On Experiments with a Transport Protocol for Pervasive Computing Environments**, Computer Networks (Elsevier), Vol. 40, No. 4, November 2002.
6. L. Kagal, V. Korolev, S. Avancha, A. Joshi, T. Finin and Y. Yesha, **Centaurus: An Infrastructure for Service Management in Ubiquitous Computing**, Wireless Networks (Kluwer), Volume 8, No. 6, November 2002.
7. T. Finin, A. Joshi, L. Kagal, O. Ratsimor, S. Avancha, V. Korolev, H. Chen, F. Perich and R. Scott Cost, **Intelligent Agents for Mobile and Embedded Devices**, International Journal of Cooperative Information Systems, Vol. 11, Nos. 3&4, Sept./Dec. 2002.

#### MAGAZINE ARTICLES

8. S. Avancha, A. Joshi and T. Finin, **Enhanced Service Discovery in Bluetooth**, IEEE Computer, Vol. 35, No. 6, June 2002.

#### REFEREED CONFERENCES

9. S. Avancha, C. Patel, A. Joshi, **Ontology-driven Adaptive Sensor Networks**, In Proc. The First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services, August 2004.
10. F. Perich, S. Avancha, D. Chakraborty, A. Joshi and Y. Yesha, **Profile Driven Data Management in Pervasive Environments**, In Proc. 13th International Workshop on Database and Expert Systems Applications, September 2002.
11. B. Bethala, A. Joshi, D. Phatak, S. Avancha and T. Goff, **Simulation of a Common Access Point for Bluetooth, 802.11 and Wired LANs**, In Proc. International Conference on Parallel and Distributed Processing Techniques and Applications, June 2002.
12. S. Avancha, D. Chakraborty, H. Chen, L. Kagal, F. Perich, T. Finin and A. Joshi, **Issues in Data Management for Pervasive Environments**, In Proc. NSF Workshop on Context Aware Mobile Database Management (CAMM), January 2002.
13. D. Chakraborty, F. Perich, S. Avancha and A. Joshi, **An Agent Discovery Architecture using Ronin and DReggie**, In Proc. 1st GSFC/JPL Workshop on Radical Agent Concepts (WRAC), January 2002.
14. D. Chakraborty, F. Perich, S. Avancha and A. Joshi, **DReggie: Semantic Service Discovery for M-Commerce Applications**, In Proc. Workshop on Reliable and Secure Applications in Mobile Environments, in conjunction with 20th Symposium on Reliable Distributed Systems, October 2001.
15. S. Avancha, V. Korolev and A. Joshi, **Transport Protocols in Wireless Networks**, In Proc. 10th IEEE International Conference on Computer Communications and Networks, September 2001.
16. S. Avancha, D. Chakraborty, D. Gada, T. Kamdar and A. Joshi, **Fast and Efficient Handoff Scheme using Forwarding Pointers and Hierarchical Foreign Agents**, In Proc. Conference on Design and Modeling of Wireless Networks, ITCOM, August 2001.

## SELECTED TECHNICAL REPORTS

17. S. Avancha, J. Undercoffer, A. Joshi and J. Pinkston, **A Clustering Approach to Secure Sensor Networks**, UMBC Technical Report TR-CS-04-01, January 2004
18. S. Avancha, A. Joshi and J. Pinkston, **On Self-Organization and Security in Distributed Wireless Sensor Networks**, UMBC Technical Report TR-CS-04-03, April 2004
19. S. Avancha, A. Joshi and J. Pinkston, **SWANS: A Framework for Adaptive Wireless Sensor Networks**, UMBC Technical Report TR-CS-05-01, March 2005

## POSTERS

20. **A Framework for Secure, Adaptive Wireless Sensor Networks**, IBM University Day, IBM Research Triangle Park, NC, February 2004

## MEMBERSHIPS:

ACM student member  
IEEE student member

## REFERENCES:

Dr. Anupam Joshi

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