# Satyajayant Misra

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## EDUCATION

**Doctor of Philosophy (8/2003 - 5/2009 (Expected))**
Department of Computer Science and Engineering
Ira A. Fulton School of Engineering
Arizona State University (ASU)
Major: Computer Science
Advisor: Prof. Guoliang Xue
Thesis: SAS: Security, Anonymity, and Survivability in Wireless Sensor and Ad Hoc Networks

**Integrated Master of Science (9/1998 - 6/2003)**
Department of Computer Science and Information Systems
Department of Physics
Birla Institute of Technology and Science (BITS), Pilani
Majors: Information Systems and Physics

## QUALIFICATION SUMMARY

My research interests are in networking and mobile computing, with emphasis on,
▷ Anonymous and Private Communication in Wireless Sensor and Ad Hoc Networks
▷ Low-cost Security and Privacy Provisioning in Wireless Ad Hoc Networks
▷ Secure Localization and Target Tracking in Wireless Ad Hoc and Sensor Networks
▷ Fault Tolerant and Robust Relays and Base Station Placement in Wireless Sensor Networks

I have co-authored 18 refereed papers in the above areas. Of them 15 have been published in prestigious peer reviewed journals and conferences, such as *IEEE Transactions on Vehicular Technology, Computer Networks, IEEE INFOCOM'2009, IEEE INFOCOM'2008, and IEEE INFOCOM'2007*. I have two papers in submission and under different stages of the review process of *IEEE/ACM Transactions on Networking* and *IEEE Transactions on Wireless Communication*. My third paper in submission in the *IEEE SECON'2009* conference. I am the primary author (researcher) in 13 of my co-authored publications.

Having published in multiple top journals and conferences as the first author, I am ready to carry out independent research at the very highest level. I have assisted my advisor in the preparation of several successful grant proposals to the NSF and ARO, as a result I have gathered the skill set needed for writing successful research grants. During my graduate and undergraduate studies I have taken many CS and EE courses. During my graduate studies I have also worked as a Teaching Associate. I can teach a variety of courses at both the graduate level and the undergraduate level. I have been a participant of the *Preparing Future Faculties* program at ASU, which is designed to equip graduate students to become effective future academics.

## AWARDS and HONORS

▷ Awarded NSF Fellowship to attend the TRUST-WISE workshop at UC Berkeley, summer 2006.
▷ Awarded student leadership award by the Computer Science and Engineering department in 2004.
▷ Participant of the group that won the third prize in the city of Phoenix Downtown Shade Modeling contest, September 2007.

▷ Student Travel Grant Award for GLOBECOM 2007, MILCOM 2007, MILCOM 2006, ICC 2006.

▷ Awarded fellowship under the Young Science Fellowship Program by Indian Institute of Science (IISc) Bangalore, for academic years 1999-2001.

▷ Best academic performance award by the Physics Department (BITS, Pilani) for exceptional performance in M.Sc (Hons) Physics, class of 2003.

▷ Ranked 6th in the M.Sc. (Tech) Information Systems class of 2003, graduating with distinction.

## RESEARCH EXPERIENCES

**Research Associate (01/2005 - Present), Dept. of Computer Science and Engineering, ASU**

I designed, implemented, and evaluated anonymous protocols for wireless sensor networks, secure localization and target tracking protocols that work in the presence of malicious anchors, relay nodes placement algorithms for wireless sensor networks, anonymity and secure authentication protocols for vehicular ad hoc networks and RFID systems.

▷ Project titled "Security and Survivability of Real-time Systems with MANETs," sponsored by NSF. I proposed and evaluated protocols for anonymous communication between the nodes of a wireless network (specifically sensor network). I also proposed and evaluated a secure target tracking protocol for tracking a mobile target in a wireless ad hoc environment.

▷ Project titled "Robustness and Survivability Issues in Wireless Ad Hoc Networks," sponsored by ARO. I designed and implemented several robust algorithms for placement of relay nodes in a constrained wireless sensor network environment to meet connectivity and survivability needs. We were the first to study problems in this domain and propose efficient solutions.

▷ Project titled "Numerical and Combinatorial Algorithms for Location Problems arising in Wireless Sensor Networks and Other Applications," sponsored by NSF. In the course of the project, I designed and implemented several algorithms for robust localization of nodes in wireless ad hoc and sensor networks when some of the anchors that help the nodes in their localization are malicious and attempt to sabotage the localization process. The algorithms also identify a large number of thes malicious anchors during localization.

▷ Project titled "Cross-layer Optimization for Dynamic Spectrum Access Wireless Mesh Networks," sponsored by NSF. I helped study the problem of joint spectrum allocation and scheduling in cognitive radio wireless networks for fair sharing of the spectrum. I helped propose and implement several algorithms to solve the problem.

**Research Intern (1/2003 - 6/2003), Veritas Software Inc., India**

I worked on an individual product named the "Veritas Configuration File Synchronizer," which was to form a part of the Veritas Cluster Server. I designed and implemented the first prototype of the product.

**Research Assistant (7/2002 - 12/2002), Department of Computer Science and Information Systems, BITS Pilani, India**

Completed M.S. thesis titled, "Internet Quality of Service with Incomplete Information." Modeled various parameters to obtain a relationship between the parameters and delay over the Internet. Proposed an efficient algorithm to find a path in the Internet given several QoS constraints.

**Project Leader and Research Assistant (7/2001 - 7/2002), Department of Computer Science and Information Systems, BITS Pilani, India**

Led the *Desktop Videoconferencing* subgroup of the IPv6@BITS group. Contributed to the design and development of a complete desktop videoconferencing toolkit.

# TEACHING EXPERIENCES

**Teaching Associate (TA) (9/2003 - 5/2005), Dept. of Computer Science and Engineering, ASU**
I worked as a teaching associate for the courses Programming with C++ (CSE 100), Data Structures using Java (CSE 210), Design and Analysis of Algorithms (CSE 450/598), and Convex Optimization with Engineering Applications (CSE 591). In the programming based courses, my TA responsibilities included conducting the computer lab sessions answering questions from students, helping them with their programming assignments, grading homework assignments and examinations, and providing solutions.
In the algorithms based courses, my TA responsibilities included setting up the assignments and the tests with the instructor, grading the assignments, helping the students with the assignments, and providing the solutions.

**Student Mentor (01/2007 - 5/2008), Research Experience for Undergraduate (REU) Program, NSF**
I have supervised three undergraduate students as their student mentor. I supervised Mr. David Weber in implementing the anonymity schemes proposed by me on the Tmotes sensor nodes using TinyOS. The implementation is available for public download. I supervised Mr. Samuel Rasmussen and Mr. David Weber in implementing a polynomial time approximation algorithm for video delivery over the Internet by using network and graph simulation tools.

# PUBLICATIONS

## Refereed Journal Papers

[1] **S. Misra**, G. Xue and S. Bhardwaj, "Secure and robust localization in a wireless ad hoc environment," *IEEE Transactions on Vehicular Technology* (**TVT**), to appear in March, 2009.

[2] **S. Misra**, M. Reisslein and G. Xue, "Multimedia streaming in wireless sensor networks," *IEEE Communications Surveys and Tutorials* (**CST**), vol. 10, no. 4, pages 18–39, 2008.

[3] **S. Misra** and G. Xue, "Efficient anonymity schemes for clustered wireless sensor networks," *International Journal of Sensor Networks* (**IJSNet**), vol. 1, no. 1/2, 2006.

[4] J. Tang, **S. Misra** and G. Xue, "Joint spectrum allocation and scheduling for fair spectrum sharing in cognitive radio wireless networks," *Journal of Computer Networks* (**ComNet**), in press.

## Refereed Conference Papers

[5] **S. Misra**, G. Xue and D. Yang, "Polynomial time approximations for multi-path routing with bandwidth and delay constraints," *IEEE Conference on Computer Communications* (**INFOCOM**), 2009 (Acceptance Rate: 282/1435).

[6] **S. Misra**, M. Verma, D. Huang and G. Xue, "SEAS: A secure and efficient anonymity scheme for low-cost RFID tags," *IEEE International Conference on Communications* (*ICC*), 2009.

[7] **S. Misra**, S. Hong, G. Xue and J. Tang, "Constrained relay node placement in wireless sensor networks to meet connectivity and survivability requirements, " *IEEE Conference on Computer Communications* (**INFOCOM**), 2008, pp. 879–887 (Acceptance Rate: 236/1160).

[8] W. Zhang, G. Xue and **S. Misra**, "Fault-tolerant relay node placement in wireless sensor networks: Problems and algorithms," *IEEE Conference on Computer Communications* (**INFOCOM**), 2007, pp. 1649–1657 (Acceptance Rate: 252/1400).

[9] **S. Misra**, G. Xue and A. Shrivastava, "Robust localization in wireless sensor networks through the revocation of malicious anchors," *IEEE International Conference on Communications* (*ICC*), 2007, pp. 3057–3062.

[10] **S. Misra** and G. Xue, "CluRoL: Clustering based robust localization in wireless sensor networks," *IEEE Military Communications Conference* (*MILCOM*), 2007.

[11] **S. Misra**, W. Zhang and G. Xue, "A Technique to enhance localization in the presence of NLOS errors," *IEEE Global Communications Conference (GLOBECOM)*, 2007, pp. 1070–1075.

[12] J. Tang, **S. Misra** and G. Xue, "Spectrum allocation and scheduling in dynamic spectrum access wireless networks," *International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks (QShine)*, 2007, pp. 2148–2158.

[13] **S. Misra**, S. Bhardwaj and G. Xue, "ROSETTA: Robust and secure target tracking in a wireless ad hoc environment," *IEEE Military Communication Conference (MILCOM)*, 2006 (Acceptance Rate: 25%).

[14] **S. Misra** and G. Xue, "SAS: A simple anonymity scheme for clustered wireless sensor networks," *IEEE International Conference on Communications (ICC)*, 2006, pp. 3414–3419.

[15] M. Bhardwaj, **S. Misra** and G. Xue, "Distributed topology control in wireless ad hoc networks using $\beta$-skeleton," *IEEE Workshop on High Performance Switching and Routing (HPSR)*, 2005, pp. 371–375.

**Papers Under Review**

[16] **S. Misra**, S. Hong, G. Xue and J. Tang, "Constrained relay node placement in wireless sensor networks: Formulation and approximations, " *IEEE/ACM Transactions on Networking (TON)* , under second round of review.

[17] **S. Misra**, A. Irani, G. Xue and J. Zhang, "Efficient STDMA schemes for improved throughput scheduling in wireless mesh networks with the physical interference model," *IEEE Transactions on Wireless Communication (TWC)*, submitted.

[18] M. Verma, **S. Misra**, D. Huang and G. Xue, "PACP: An efficient pseudonymous authentication based conditional privacy protocol for VANETs," *IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, 2009.

# CONFERENCE PRESENTATIONS

▷ Constrained relay node placement in wireless sensor networks to meet connectivity and survivability requirements, *IEEE Conference on Computer Communications (INFOCOM)*, April, 2008, Phoenix, AZ.

▷ CluRoL: Clustering based robust localization in wireless sensor networks, *IEEE Military Communication Conference (MILCOM)*, October, 2007, Orlando, FL.

▷ A Technique to Enhance Localization in the Presence of NLOS Errors, *IEEE Global Communications Conference (GLOBECOM)*, November, 2007, Washington D.C.

▷ ROSETTA: Robust and Secure Target Tracking in a wireless ad hoc environment, *IEEE Military Communication Conference (MILCOM)*, October, 2006,Washington D.C.

# PROFESSIONAL SERVICES

**Technical Program Committee Member:**
▷ IEEE ICC 2009, Ad Hoc and Sensor Networks Symposium.
▷ ChinaCom 2008.
▷ IEEE GLOBECOM'2006, Wireless Ad Hoc and Sensor Networks Symposium.

**Reviewer:**
▷ IEEE/ACM Transactions on Networking.
▷ IEEE Transactions on Wireless.
▷ IEEE Transactions on Vehicular Technology.

▷ IEEE Communications on Surveys and Tutorials.
▷ Elsevier Computer Networks.
▷ IEEE International Conference on Communications (ICC'2009).
▷ IEEE International Conference on Communications (ICC'2008).
▷ IEEE Conference on Sensor and Ad Hoc Communications and Networks (SECON'2007).
▷ IEEE Mobile Ad Hoc and Sensor Systems (MASS'2006).
▷ IEEE International Conference on Computer Communications and Networks (ICCCN'2006).
▷ IEEE International Conference on Communications (ICC'2006).

**Other Services:**
▷ Lead and organized the graduate student volunteers in INFOCOM 2008, Phoenix, AZ.
▷ Student volunteer at IEEE Performance Computing and Communications Conference (IPCCC'2005).
▷ Student volunteer at IEEE Workshop on High Performance Switching and Routing (HPSR'2004).

## PROFESSIONAL SKILLS

▷ Software Development: C/C++, nesC, Java, Perl, UML, JavaScript, XML, Java RMI, SQL
▷ Simulation Tools: OPNET, Qualnet, ns2, Matlab
▷ Networking: Socket Programming
▷ Optimization Tools: CPLEX, LEDA
▷ Database Systems: Sybase, Oracle
▷ Operating Systems: Windows, Linux, Solaris, TinyOS
▷ Hardware Platform: Tmotes, Mica motes

# REFERENCES

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