Mahasweta Sarkar

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Profile:

Dr. Sarkar is an Assistant Professor in the Department of Electrical and Computer Engineering at San Diego State University (SDSU). She joined SDSU as a tenure-track faculty in August 2006. Her research interest lies in the area of wireless data networks. Her work addresses issues like scheduling, routing, optimal resource allocation, power management in wireless networks like WLANs, WMANs, Sensor Networks and Ad Hoc Networks. She currently advises 10 graduate students on their thesis work. Dr. Sarkar has also been instrumental in setting up the Wireless Multimedia Communications and Networks Lab in her department. The lab is equipped with various state-of-the-art wireless network test beds, such as Cognitive Radio Networks, Wireless Sensor Networks, ZigBee and WLANs.

Education:

- Ph.D. in Computer Engineering, December 2005
  University of California, San Diego (UCSD).

  Thesis Title:
  Study of Efficient Energy and Delay Tradeoff in a Wireless Local Area Networks
  Advisor: Prof. Rene L. Cruz

- M.S. in Computer Engineering, July 2003.
  University of California, San Diego.

- B.S. in Computer Science, July 2000 ***[Summa Cum Laude]***
  San Diego State University, San Diego, CA.

Areas of Research Interest:

Energy conscious communication protocols in wireless data networks. Scheduling, routing and flow control in wireless networks. Design, analysis and evaluation of different wireless network protocols and architecture.

Grants:

- National Science Foundation grant (MRI) *"Acquisition of Test Bed For Next Generation of Cognitive Radio Wireless Networks"*, 2007 (Awarded)

- National Science Foundation grant (CCLI) *"Integration of 4G Heterogeneous Network Laboratory into the ECE Undergraduate Curriculum",* 2008 (Awarded)

- SDSU University Grant program, *"A Neighbor Discovery Algorithm for Directional Antennas"*, 2008 (Awarded)

- National Science Foundation grant (CNS, NeTs:Small) *"NeTS:Small:A Game-Theoretic Implementation of QoS in the 802.11e MAC Sublayer",* 2008 (Not Awarded)

- National Science Foundation grant (CNS: NeTs: CAREER) *"A Medium Access Control (MAC) Architecture for Personalized, Mobile and Ubiquitous Telemedicine Applications"*, July, 2009 (Submitted)

- National Science Foundation grant (CNS, NeTs:Medium) *"Collaborative Research: SWoMNets -- Small- World Wireless Mesh Networks", August, 2009 (Submitted in Collaboration with CAL(IT)2 at UCSD)* (Submitted)

- National Science Foundation grant (IHCS) *"Designing and Prototyping a Location Aware "Smart Badge" for Automated Networking", October, 2009* (Submitted)

- National Science Foundation grant (CNS, NeTs:Small) *"Redefining QoS in 802.11e - A Survival Strategy for the "Underdog" traffic", December 2009* (Submitted)

- California State University Program for Education and Research in Biotechnology (CSUPERB) *"Wireless Cardiac Event for In-hospital Cardiac Arrest", March 2010*
- ERC"" in collaboration with University of Washington and Massachusetts Institute of Technology (MIT) (under Review)

- National Science Foundation grant (CNS, NeTs:Medium) *"Collaborative Research: SWoMNets -- Small- World Wireless Mesh Networks", September 2010, (Submitted in Collaboration with CAL(IT)2 at UCSD)* (Submitted)

- SDSU University Grant program, *"Wireless Health"*, September 2010 (Submitted)

- National Science Foundation grant (CNS, NeTs: Small) *"Collaborative Research: Towards a Green Cellular Network through User and Application Aware*

Dynamic Cell Reconfiguration", December 2010, (in Collaboration with Dr.Sujit Dey at ECE dept. at UCSD) (To be submitted on 12/17/2010)

- *Von Leibig Center Grant Program, "Location Aware BioSensor for Ubiqutous Monitoring" November 2010 (with Karen May Newman)*

Recent Refereed Publications (Journal/Book Chapters):

1. *"Study of a Power Management Technique and its Impact on the Energy-Delay Tradeoff in a WLAN"* Mahasweta Sarkar and Rene. L Cruz. In Computer Networks: The International Journal of Computer and Telecommunications Networking, Elsevier North Holland Inc., vol. 51, issue 14, pp 4005-4031, October 2007

2. *"MMMP:A MAC Protocol to Ensure QoS for Multimedia Traffic over Multi-hop Ad Hoc Networks",* Sunil Kumar, Mahasweta Sarkar, Supraja Gurajala and John Matyjas, Journal of Information Processing Systems, Korea Information Processing Society, Volume 4, Number 2, pp 41-52, May 2008

3. *"An Algorithm to Enhance QoS for Streaming Video over WLANS",* Mahasweta Sarkar and Ramesh Goel, Advances in Electrical and Electronics Engineering - IAENG Special Edition of the World Congress on Engineering and Computer Science 2008, (ISBN: 978-0-7695-3555-5) (Book Chapter), pp 76-85, 2008

4. *"A QoS and Power Aware MAC Layer Protocol for Wireless AdHoc Networks"*, Mahasweta Sarkar and Sahitya Borra, Advances in Electrical and Electronics Engineering - IAENG Special Edition of the World Congress on Engineering and Computer Science 2008, (ISBN: 978-0-7695-3555-5) (Book Chapter), pp 94-104, 2008

5. *"Dynamic Management of Quality of Service with Priority for Multimedia Multicasting",* Sunil Kumar, Mehul Vora and Mahasweta Sarkar, *International Journal of Autonomous and Adaptive Communications Systems*, Inderscience Publishers, Volume 2, Issue 1, pp. 87-105, 2009

6. *"Enhancing QoS in IEEE 802.16"*, Mahasweta Sarkar and Chriayu Nagaraj, IAENG Transactions on Engineering Technologies, Volume 4 (Book Chapter), Published by American Institute of Physics, ISBN 978-0-7354-0794-7, pp 56-70, June 2010

7. *"A Packet Scheduling Scheme for enhanced QoS in WiMAX",* Mahasweta Sarkar and Harpreet Sachdeva, *IAENG Transactions on Engineering Technologies*, Volume 4 (Book Chapter), Published by American Institute of Physics, ISBN 978-0-7354-0794-7, pp 13-25, June 2010

8. *"Power Management in Wireless AdHoc Networks with Directional Antennas"* Mahasweta Sarkar and Ankur Gupta, International Journal of Computer and Network Security, Volume 2, Issue No.6, pp 20-29, June 30, 2010

9. *"A Bidding Based Resource Allocation Scheme for WiMAX"*, Mahasweta Sarkar and Padmasini Chadramouli, International Journal of Computer and Network Security, Volume 2, Issue No.6, pp 30-40, June 30, 2010

10. "Cloud Computing : An Overview", Abhishek Kalapatapu and Mahasweta Sarkar, Book Chapter in "Cloud Computing : Methodology, System and Applications", Published by CRC, Taylor and Francis Group, To be published in June 2011

11. *"A Game-theoretic Analysis of QoS in Wireless MAC"*, Mahasweta Sarkar, Pavan Nuggehalli, K.Kulkarni and R.R.Rao, Submitted to the IEEE Journal of Wireless Communication, (Under Review)

12. "*Redifining QoS in Wireless Broadband Networks using the Nash Bargaining Principle*", Mahasweta Sarkar and Padmasini Chandramouli, Submitted to the Elsevier Journal of Computer Networks (Under Review)

13. "*Analyzing and Optimizing the Hybrid MAC in WLANs for QoS Support*", Christopher Paolini, Mahasweta Sarkar and Rohitha Vakamudi, Submitted to the Elsevier Journal of Computer Networks (Under Review)

Recent Refereed Publications (Peer-Reviewed Conferences):

1. *"A SINR Based MAC Layer Protocol for Multi-Channel Ad-Hoc Networks" Mahasweta Sarkar, Imran Balsania and Santosh Nagaraj,* Proceedings of the 7th International Wireless Communication and Mobile Computing Conference (IWCMC), Istanbul, Turkey, July 2011

2. *"A MAC Layer Protocol for Sensor Networks using Directional Antennas", Sultan Budhwani, Mahasweta Sarkar and Santosh Nagaraj*. IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing, Newport Beach, California, USA, June 2010

3. *"Channel Selection using Asynchronous Multichannel MAC Protocol for AdHoc Networks",* Jeemil Shah and Mahasweta Sarkar, Proceedings of the 6th International Wireless Communication and Mobile Computing Conference, Caen, France, July 2010

4. *"Adaptive Modulation for Limited Diversity Fading Channels",* Santosh Nagaraj and Mahasweta Sarkar. Proceedings of IEEE VTC-Fall, Anchorage, Alaska, September 2009

5. "*A QoS Aware Packet Scheduling Scheme For WIMAX*", Mahasweta Sarkar and Harpreet Sachdeva, Proceedings of IAENG Conference on World Congress on Engineering and Computer Science (WCECS), Berkeley, California, October 2009

6. "*A Packet Scheduling Algorithm To Enhance Quality Of Service in IEEE 802.16*", Chirayu Nagaraj and Mahasweta Sarkar, Proceedings of IAENG Conference on World Congress on Engineering and Computer Science (WCECS), Berkeley, California, October 2009

7. "*A Power Efficient MAC Protocol for Wireless Ad hoc Networks that uses Directional Antennas*", Mahasweta Sarkar and Chandrasekhar Poduri, Proceedings of IAENG Conference on World Congress on Engineering and Computer Science (WCECS), Berkeley, California, October 2009

8. *"Evaluating a QoS-supportive MAC layer protocol for WLANs"*, Mahasweta Sarkar, Moumita Ray and Pavan Nuggehalli. Proceedings of IEEE MILCOM, San Diego, November 2008

9. *"Enhancing QoS of streaming Videos over WLANs",* Ramesh Goel and Mahasweta Sarkar, Proceedings of IAENG WCECS, Berkeley, California, October 2008

10. *"A QoS Enabled MAC Protocol for Wireless Adhoc Networks with Power Management",* Mahasweta Sarkar and Sahitya Bora. Proceedings of IAENG WCECS, Berkely, California, October 2008

11. *"A Game-theoretic Analysis of QoS in Wireless MAC"*, Pavan Nuggehalli, Mahasweta Sarkar, Kishor Kulkarni and Ramesh Rao. Proceedings of IEEE INFOCOM Mini Conference, Phoenix, Arizona, April 2008

12. *"MAC Layer Power Efficiency Analysis in a WLAN"* Mahasweta Sarkar Proceedings of Wireless Telecommunication Symposium (WTS), Pomona, California, April 2008

13. *"Dynamic Management of QoS for Multimedia Multicasting"* Mahasweta Sarkar, Sunil Kumar and Mehul Vohra Proceedings of IEEE IWCMC, Crete Island Greece, August 2008

14. *"A MAC Layer Dynamic Power Management Scheme For Multiple Users in a WLAN,"* Mahasweta Sarkar. Procedings of IEEE WCNC, Hong Kong, March 2007

15. *"A MAC Protocol to Support QoS for Multimedia Traffic Transmission over Ad Hoc Networks"* Mahasweta Sarkar, Supraja Gurajala, Sunil Kumar.

Proceedings of the International Wireless Communications and Mobile Computing Conference (IWCMC), Honolulu, Hawaii, U.S.A, August 2007.

16. *"A QoS Aware Medium Access Control Protocol for Real Time Traffic in Ad hoc Networks"* Mahasweta Sarkar, Supraja Gurajala, Sunil Kumar. Proceedings of the 18th Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Athens, Greece, September 2007

17. *"QoS and Selfish Users : A MAC Layer Perspective"*, Pavan Nuggehalli, Mahasweta Sarkar, Ramesh Rao. In the Proceedings of IEEE GLOBECOM, Washington D.C, U.S.A, November, 2007

18. "*An Adaptive Sleep Algorithm for Efficient Power Management in WLAN,"* Mahasweta Sarkar and Rene. L. Cruz. Proceedings of IEEE Vehicular Technology Conference, Spring , Stockholm, Sweden, May 2005

19. "*Analysis of Power Management for Energy and Delay Tradeoff in a WLAN*," Mahasweta Sarkar and Rene. L Cruz. Proceedings of the Conference on Information Sciences and Systems, Princeton, New Jersey, March 2004.

Some of Dr. Sarkar's Current Research Focus:

- Wireless Health
- Cloud Computing
- Re-defining Socialization – the digital way
- Optimization of packet delay and energy consumption in wireless nodes
- Directional Antennas : neighbor discovery and topology control issues
- QoS issues in wireless and ad hoc networks (especially for multimedia traffic)
- Scheduling algorithms for Wi-Max networks (802.16)
- Smart channel access schemes for sensor networks and 802.11e
- MAC layer channel scheduling schemes for dynamic spectrum allocation in the PHY layer (Multi-channel issues)

Courses Taught:

- CompE160: Introduction to Programming in C++
- CompE260: Data Structures in Object Oriented Programming
- CompE560: Computer Data Networks
- EE 660: High Speed Wireless Networks

Appointments:

Aug2006-Present :	Assistant Professor, San Diego State University
Jan 2006 – Aug 2006 :	Staff Scientist at SPAWAR Systems Center
Aug 2000 – Dec 2005:	Research Assistant, UC, San Diego
July 1999–Aug 2000:	Systems Engineer Intern, Sun Microsystems, La Jolla, CA

Professional Affiliations and Services:

- Member IEEE
- Reviewer for several IEEE prestigious conferences: MOBICOM 2003,2004,2009; MOBIHOC 2003; MSWiM 2003-2004; WCNC 2004-2007;2009-2010; GLOBECOM 2006-2009; INFOCOM 2007,2010; VTC 2009, ISWPC 2010, SUTC 2010
- Reviewer for several IEEE journals: IEEE Journal on Wireless Communication, IEEE Transactions on Wireless Networks, IEEE Transactions on Vehicular Technology, IEEE Journal on Selected Areas of communication
- Reviewer of Computer Science Books:
    (i) "An Active Learning Approach to Data Structures using C" by Timothy A. Budd
    (ii) "Computer Networks: An Open Source Approach" by Le Lin, Published by McGraw Hills, March 2011
- TPC on several technical conferences: PIMRC 2009; ISWPC 2010; WCECS 2008,2009,2010; IEEE SUTC 2010;
- KeyNote Speaker at ERA 2010, CITEDI, Tijuana, Mexico Talk Title: "Impact of Wireless Technology on Life Sciences and Social Sciences"

Honors and Awards:

- Recipient of "President's Leadership Award for Faculty Excellence", 2010
- Inclusion in "Who's Who in America" 2008, 2009, 2010
- Research assistantship at UCSD: 2001 – 2005.
- Teaching assistantship at UCSD: 2000 - 2001.
- National Dean's List in 1998-99.
- National Scholarship in India: 1991, 1993.

Special Study and Undergraduate Projects/Theses Chaired:

1. Ms. Rizwana Anjum, "**Sensor Networks"**, Spring 2007.

2. Ms. Manjukiran Vishwanath, **"MAC Layer Challenges Associated with Directional Antennas"**, Spring 2007.

3. Mr. David Martin, **"Configuring Spectrum Analyzer for the 4G Heterogeneous Network Lab"**, Spring 2009

4. Mr.Rohit Jain, **"Reducing Handover in Femto cells"**, Summer 2010

5. EE499: **"Aquamizer: A Wireless Water Monitoring System"**, Fall 2009

Theses Chaired (Students Graduated):

6. Mr. Sandeep Arugonda
   Thesis Title: "**Comparative Study of Neighbor Discovery Scheme using Directional Antennas in an Ad-Hoc Network",** Spring 2008

7. Ms. Sahitya Bora
   Thesis Title: "A QoS Enabled MAC Protocol for Ad Hoc Wireless Networks with Power Control", Summer 2008
   Publication: *"A QoS and Power Aware MAC Layer Protocol for Wireless AdHoc Networks",* Mahasweta Sarkar and Sahitya Borra, in IAENG Transactions on Electrical and Electronics Engineering Volume I - Special Edition of the World Congress on Engineering and Computer Science 2008 (ISBN: 978-0-7695-3555-5) pp 94-104. Published by *IEEE Computer Society for the World Congress on Engineering and Computer Science 2008*.

8. Mr. Chandu Poduri
   Thesis Title: "An adaptive Power Control Scheme in a Wireless AdHoc Network using Directional Antenna", October 2008
   Publication: "*A Power Efficient MAC Protocol for Wireless Ad hoc Networks that uses Directional Antennas*", Mahasweta Sarkar and Chandrasekhar Poduri, Proceedings of IAENG Conference on World Congress on Engineering and Computer Science (WCECS), Berkeley, California, October 2009

9. Ms. Moumita Ray
   Thesis Title: "QoS in 802.11e", November 2008
   Publication: *"Evaluating a QoS-supportive MAC layer protocol for WLANs"*, Mahasweta Sarkar, Moumita Ray and Pavan Nuggehalli. Proceedings of IEEE MILCOM, San Diego, November 2008

10. Mr. Sunil Lakamsani
    Thesis Title : **"A Reservation Based MAC Protocol for Adhoc Networks",** Nov 2008

11. Mr. Harpreet Sachdeva
    Thesis Title: "A Hybrid Scheduling Scheme for Maximizing Throughput in IEEE 802.16", April 2009
    Publication:"*A QoS Aware Packet Scheduling Scheme For WIMAX*", Mahasweta Sarkar and Harpreet Sachdeva, *IAENG Transactions on Engineering Technologies,* Published by American Institute of Physics, Volume 4, 2010

12. Mr. Jeemil Shah

Thesis Title: A Channel Selection Scheme in a Multi-Channel MAC Protocol in 802.11 Architecture (February 2010)
Publication: *"Channel Selection using Asynchronous Multichannel MAC Protocol for AdHoc Networks",* Jeemil Shah and Mahasweta Sarkar, Proceedings of the 6th International Wireless Communication and Mobile Computing Conference, Caen, France, July 2010

13. Ms. Padmasini Chandramouli
Thesis Title: A Bidding based Resource Allocation Scheme in WiMAX (March 2010)
Publication: *"A Bidding Based Resource Allocation Scheme for WiMAX"*, Mahasweta Sarkar and Padmasini Chadramouli, International Journal of Computer and Network Security, Volume 2, No.5, Issue May 2010

14. Mr. Chirayu Nagaraj
Thesis Title: A Packet Scheduling Algorithm to Enhance QoS in IEEE 802.16 (March 2010)
Publication: *"Enhancing QoS in IEEE 802.16"*, Mahasweta Sarkar and Chriayu Nagaraj, *IAENG Transactions on Engineering Technologies,* Published by American Institute of Physics, Volume 4, 2010

15. Ms. Rohitha Vakamudi
Thesis Title: A MAC Layer protocol for the "Underdog" Traffic (March 2010)

16. Mr. Imran Haider Balsania
Thesis Title: A SINR Based MAC Layer protocol for Multi-Channel Ad Hoc Networks (4/1/10)
Publication: *"A SINR Based MAC Layer Protocol for Multi-Channel Ad-Hoc Networks" Mahasweta Sarkar, Imran Balsania and Santosh Nagaraj,* Proceedings of the 7th International Wireless Communication and Mobile Computing Conference (IWCMC), Istanbul, Turkey, July 2011

17. Mr. Ankur Gupta
Thesis Title: Power Management in Wireless AdHoc Networks with Directional Antennas (May 2010)
Publication: *"Power Management in Wireless AdHoc Networks with Directional Antennas"* Mahasweta Sarkar and Ankur Gupta, International Journal of Computer and Network Security, Volume 2, No.5, Issue May 2010

18. Mr. Vishal Rajyaguru
Thesis Title: "Studying Traffic Characteristics in a university wide Ad-Hoc Network Test-bed" [in collaboration with Cal(IT)2 at UCSD] (April 2010)

19. Ms. Darshana Garach

Thesis Title: "A Cross Layer Optimization for Power Management in Wireless Ad Hoc Networks" (October, 2010)

20. Ms. Dharshana Vijayraghavan
    Thesis Title: "Performance Analysis for IEEE 802.15.4 for Wireless Body Area Networks**"** (October, 2010)

21. Mr. Sultan Budhwani
    Thesis Title: A MAC Layer protocol for Sensor Networks using Directional Antenna (November 2010)
    Publication: *"A MAC Layer Protocol for Sensor Networks using Directional Antennas", Sultan Budhwani, Mahasweta Sarkar and Santosh Nagaraj.* IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing, Newport Beach, California, USA, June 2010

22. Mr. Abhiram Devineni
    Thesis Title: "Performance Evaluation of Body Area Network Using Zigbee Protocol" (11/30/2010)

23. Mr. Ali Abbas Vohra
    Thesis Title: "A Priority Based MAC Protocol For Wireless Body Area Networks (WBANs)

Theses Chair (Current Students)

24. Mr. Anoop Karkhanis
25. Mr. Archit Kapoor
26. Mr. Vikram Santhanam
27. Mr. Abhishek
28. Ms. Priya
29. Ms. Chithra Shanmugam
30. Ms. Swati Kode
31. Ms. Sahana Pillappa