

# Mariyam Mirza

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CONTACT INFORMATION	421 W. Gilman St Apt 2F Madison, WI, U.S.A.	cell: +1 608 577 4342 e-mail: mirza@cs.wisc.edu
OBJECTIVE	Full-time employment beginning fall of 2012.	
EDUCATION	<b>University of Wisconsin-Madison</b> , Madison, Wisconsin, U.S.A. <i>Ph.D. in Computer Science</i> <b>August 2006 – May 2012</b> <ul style="list-style-type: none"><li>• Advisor: Dr. Paul Barford.</li><li>• Research area: computer networking (network measurements).</li><li>• Ph.D. minor: intellectual property law.</li></ul> <i>M.S. in Computer Science</i> <b>August 2004 – May 2006</b> <ul style="list-style-type: none"><li>• G.P.A: 3.88/4.00.</li></ul> <b>Duke University</b> , Durham, North Carolina, U.S.A. <i>Graduate Student in Computer Science</i> <b>August 2002 – May 2004</b> <b>Princeton University</b> , Princeton, New Jersey, U.S.A. <i>B.S.E. in Computer Science</i> <b>September 1998 – June 2002</b> <ul style="list-style-type: none"><li>• Graduated magna cum laude.</li><li>• G.P.A: 3.78/4.00.</li><li>• Departmental G.P.A: 3.96/4.00.</li><li>• Member Tau Beta Pi honor society. Membership limited to first quintile of engineering students.</li><li>• Student member Sigma Xi scientific research society.</li><li>• Academic achievement awards from the Princeton University B.S.E. program for spring 2000, fall 2000, spring 2001 and fall 2001.</li></ul>	
PUBLICATIONS	Mirza, M., Barford, P., Zhu, X., Banerjee, S., and Blodgett, M., <i>Fingerprinting 802.11 Rate Adaptation Algorithms</i> . In IEEE INFOCOM, April 2011. Mirza, M., Sommers, J., Barford, P., and Zhu, X., <i>A Machine Learning Approach to TCP Throughput Prediction</i> . In IEEE/ACM Transactions on Networking, Volume 18, Issue 4, 2010. Mirza, M., Springborn, K., Banerjee, S., Barford, P., Blodgett, M., and Zhu, X., <i>On the Accuracy of TCP Throughput Prediction for Opportunistic Wireless Networks</i> . In IEEE SECON, June 2009. Mirza, M., Sommers, J., Barford, P., and Zhu, X., <i>A Machine Learning Approach to TCP Throughput Prediction</i> . In ACM SIGMETRICS, June 2007.	
HONORS AND AWARDS	ACM-W scholarship to attend ACM SIGCOMM 2009. Student travel grant to attend ACM SIGCOMM 2009. Travel grant to attend ACM SIGMETRICS 2008.	
SOFTWARE	PATHPERF, an end-to-end tool for predicting TCP throughput using lightweight active measurements and machine learning techniques, available at <a href="http://wail.cs.wisc.edu/waildownload.py">http://wail.cs.wisc.edu/waildownload.py</a> .	
SKILLS	Experienced C programmer.	

*Fingerprinting 802.11 Rate Adaptation Algorithms.*

This project develops a method for identifying the 802.11 rate adaptation algorithms deployed in a wireless network using a combination of passive monitoring and machine learning. There is a large body of research on the design of rate adaptation algorithms and another on diagnosing performance bottlenecks in 802.11 networks. However, there is no way to identify the rate adaptation algorithms deployed in a production network. Consequently, there is currently no way to combine the techniques in these two bodies of work to determine how the choice of rate adaptation algorithms effects production network performance. Our work is the first step in addressing this problem. Our approach identifies rate adaptation algorithms with an accuracy exceeding 95%, and is based entirely on passive network monitoring, *i.e.*, it does not rely on participation or cooperation of users and does not introduce any measurement traffic into the network.

*On the Accuracy of TCP Throughput Prediction for Opportunistic Wireless Networks.*

Wi-fi connectivity has become ubiquitous over the past decade, resulting in dense deployments of open wi-fi access points in urban areas. This has enabled a model of connectivity called *opportunistic* networking in which clients within the range of an AP for a short amount of time, *e.g.*, passing by in a moving vehicle, use the connectivity opportunity for application data transfer. To make the most of connectivity opportunities, clients in such networks need to select APs that yield the highest throughput, and also limit non-TCP traffic to TCP friendly rates to prevent congestion. TCP throughput predictions between clients and candidate APs can provide this information. Prior art approaches for modeling wireless throughput require pairwise measurements between all senders in the network. Such measurements are not feasible because they take tens of seconds or longer, and the client is within range of an AP for only a few seconds in the vehicular opportunistic scenario. Our approach, based on analyzing short active measurements using machine learning techniques, predicts throughput within a factor of two of actual using active measurements lasting only 0.3 seconds and involving only the wireless access point and the client of interest. Hence our approach is accurate and quick enough to be useful to applications in vehicular opportunistic networks.

*A Machine Learning Approach to TCP Throughput Prediction.*

The goals of any technique for predicting TCP throughput is to achieve high accuracy and agility while minimizing measurement overhead. Earlier approaches have found it difficult to achieve all these goals simultaneously, and consequently have been forced to make tradeoffs between them. This project develops an approach for predicting end-to-end TCP throughput that eliminates the need for these tradeoffs. The approach is based on the analysis of lightweight active measurements of network path properties using powerful machine learning techniques. It significantly outperforms the best prior art technique in terms of accuracy and agility in both the laboratory environment and over a diverse set of wide area paths while maintaining a significantly lower measurement overhead.

**University of Wisconsin-Madison**, Madison, Wisconsin, U.S.A.

*Graduate Research Assistant*

**June 2005 – May 2012**

Research assistant in computer networks (network measurements) for Dr. Paul Barford.

*Graduate Teaching Assistant*

**January 2005 – May 2005**

Teaching assistant for undergraduate operating systems course. Responsibilities included grading assignments, holding office hours and conducting help sessions for assignments.

**Deutsche Telekom Laboratories**, Los Altos, California, U.S.A.

*Research Intern*

**September 2009 – December 2009**

Worked on project investigating the feasibility of single vantage point monitoring of wireless networks.

**Duke University**, Durham, North Carolina, U.S.A.

*Graduate Teaching Assistant*

**January 2003 – March 2003, January 2004 – May 2004**

Teaching assistant for introductory undergraduate computer science courses. Responsibilities included running laboratory sessions, holding weekly review sessions, holding office hours and managing undergraduate teaching assistants.

**Agere Systems**, Allentown, Pennsylvania, U.S.A.

*Software Development Intern*

**June 2001 – August 2001**

Participated in the development of a DSP simulator.

**Princeton University**, Princeton, New Jersey, U.S.A.

*Undergraduate Teaching Assistant*

**September 1999 – May 2001**

Responsible for assisting undergraduates in introductory computer science courses with programming assignments.

**VOLUNTEER  
ACTIVITIES**

**Mickaboo Companion Bird Rescue**, San Jose, California, U.S.A.

*Volunteer*

**September 2009 – December 2009**

Represented Mickaboo at community events and disbursed information regarding exotic bird care.

**Feathered Friends Sanctuary and Rescue**, Edgerton, Wisconsin, U.S.A.

*Volunteer and Adoption Committee Member*

**June 2005 – August 2009**

Responsibilities included rehabilitating and socializing exotic birds to make them fit for adoption, interviewing prospective adopters, reviewing adoption applications, organizing fundraisers, writing grant applications and shelter cleaning and maintenance.

**Princeton University**, Princeton, New Jersey, U.S.A.

*Volunteer for Alumni Schools Committee*

**January 2006 – March 2009**

Interviewed both U.S. (in person) and international (over the phone) high school students applying to the university and submitted detailed reports to the university's admissions office.

**University of Wisconsin-Madison Computer Science Dept.**, Madison, Wisconsin, U.S.A.

*Chief Organizer for Prospective Graduate Student Visit Weekend*

**March 2005**

Responsibilities included scheduling faculty presentations and meetings, and managing a large team of student volunteers to arrange social activities, housing, meals and transportation for 40 visitors.

*Student Volunteer for Graduate Admissions Committee*

**January 2005 – March 2005**

Responsibilities included assisting faculty in reviewing applications, attending admissions committee meetings and participating actively in discussions regarding close decisions.

**LANGUAGES**

Bilingual, with fluency in English and Urdu (native speaker).

Elementary/intermediate knowledge of Italian.

**REFERENCES**

*Available on request.*