

Muhammad Usman Ilyas

935 Cherry Lane, Apt E, Michigan State University, East Lansing, MI 48823-6013

(Res) +1-517-355-8092, (Cel) +1-517-899-4374, (Off) +1-517-355-3769

ilyasmuh@egr.msu.edu, <http://www.egr.msu.edu/waves/people/usman.htm>



Qualifications	Ph.D. in Electrical Engineering 2009 <i>Michigan State University, East Lansing, MI.</i> Advisor: Dr. Hayder Radha.
	<hr/> M.S. in Electrical Engineering 2007 <i>Michigan State University, East Lansing, MI.</i>
	<hr/> M.S. in Computer Engineering (Dean's List) 2004 <i>Lahore University of Management Sciences, Lahore, Pakistan.</i> Concentration in Computer Architecture; graduated on Dean's List with 3.78 G.P.A.
	<hr/> B.E. (Honors) in Electrical Engineering 1999 <i>National University of Sciences & Technology, Rawalpindi, Pakistan.</i> Concentration in Electronics; graduated with <i>Honors</i> with 3.502 G.P.A.
Expertise & Research Interests	Wireless networks; MANETs; Ad-hoc networks, Wireless sensor networks; Wireless channel modeling; Cross-layer architectures and optimization; Network lifetime; Applications of sensor networks; Network science; Emerging issues in IEEE 802.15.4/ LR-WPANs.
Memberships	<ul style="list-style-type: none">▪ Association for Computing Machinery (ACM).▪ Institute of electrical & Electronics Engineers (IEEE).▪ IEEE Communications Society (ComSoc).▪ Pakistan Engineering Council (PEC).
Honors & Awards	<ul style="list-style-type: none">▪ 2008 - Research Enhancement Award from The Graduate School (\$US 300).▪ 2007 - 2nd prize in International Student Essay Competition organized by the MSU Office of International Students & Scholars (OISS). (\$US 500).▪ 2006 - Research Enhancement Award from the Graduate School (\$US 1,000).▪ 2005 - Faculty Development Program Fellowship of the National University of Sciences & Technology (NUST) - (upto \$US 90,000).▪ 2002 - Split Ph.D. Scholarship of the Higher Education Commission, Government of Pakistan to pursue post-graduate studies at MSU and LUMS (upto \$US 75,000).▪ 2002 - Ph.D. Fellowship of the Lahore University of Management & Sciences (LUMS) - (\$US 10,000).▪ 1996-1999 – Five time recipient NUST Undergraduate Merit Scholarship (semesters I, II, III, IV and IX).
Volunteer Service	TPC Member: IEEE Globecom (GC) 2007/2008/2009. Reviewer: IEEE Transactions on Wireless Communication (TWC), IEEE Transactions on Multimedia (TMM), ACM Transactions on Internet Technologies, Elsevier Journal of Visual Comm. and Image Representation (JVCI), IEEE International Conference on Communications (ICC) 2006. Graduate Student Representative: Engineering College Advisory Committee (ECAC), College of Engineering, Michigan State University.

Publications

1. **Muhammad U. Ilyas**, Moonseong Kim and Hayder Radha, "Reducing Packet Losses in Networks of Commodity IEEE 802.15.4 Sensor Motes Using Cooperative Communication and Diversity Combination," *28th IEEE International Conference on Computer Communications (INFOCOM'09)*, Rio de Janeiro, Brazil, April 19 - 25, 2009.
 2. **Muhammad U. Ilyas**, and Hayder Radha, "Modeling, Estimating and Predicting the Packet-level Bit Error Rate Process in IEEE 802.15.4 LR-WPANs Using Hidden Markov Models," *43rd Conference on Information Sciences and Systems (CISS'09)*, Baltimore, MD, United States, March 18 - 20, 2009.
 3. **Muhammad U. Ilyas**, and Hayder Radha, "Measurement Based Analysis and Modeling of the Error Process in IEEE 802.15.4 LR-WPANs," *27th IEEE International Conference on Computer Communications (INFOCOM'08)*, Phoenix, AZ, United States, April 15 - 17, 2008.
 4. **Muhammad U. Ilyas**, and Hayder Radha, "Measuring Packet-level Memory Length of 802.15.4 Wireless Channels with Relative Mutual Information," *IEEE International Conference on Communications (ICC'08)*, Beijing, China, May 19 - 23, 2008.
 5. **Muhammad U. Ilyas**, and Hayder Radha, "Long Range Dependence of IEEE 802.15.4 Wireless Channels," *IEEE International Conference on Communications (ICC'08)*, Beijing, China, May 19 - 23, 2008.
 6. **Muhammad U. Ilyas**, and Hayder Radha, "A Channel Model for the Bit Error Rate Process in 802.15.4 LR-WPAN Wireless Channels," *IEEE International Conference on Communications (ICC'08)*, Beijing, China, May 19 - 23, 2008.
 7. **Muhammad U. Ilyas**, and Hayder Radha, "On Measuring Memory Length of the Error Rate Process in Wireless Channels," *42nd Conference on Information Sciences & Systems (CISS'08)*, Princeton, NJ, United States, March 19 - 21, 2008.
 8. **Muhammad U. Ilyas**, and Hayder Radha, "Bounding A Statistical Measure Of Network Lifetime For Wireless Sensor Networks," *41st Conference on Information Sciences & Systems (CISS'07)*, Baltimore, MD, United States, March 14 - 16, 2007.
 9. Shirish Karande, Kiran Misra, **Muhammad U. Ilyas**, Hayder Radha, "Adaptive Network Coding With Noisy Packets," *41st Conference on Information Sciences & Systems (CISS'07)*, Baltimore, MD, United States, March 14 - 16, 2007.
 10. Syed A. Khayam, Shirish Karande, **Muhammad U. Ilyas**, and Hayder Radha, "Header Detection to Improve Multimedia Quality Over Wireless Networks," *IEEE Transactions on Multimedia (TMM)*, Vol. 9, No. 2, pp. 377 -385 , February 2007.
 11. **Muhammad U. Ilyas** and Hayder Radha, "Increasing Network Lifetime Of An IEEE 802.15.4 Wireless Sensor Network By Energy Efficient Routing," *IEEE Conference on Communications (ICC'06)*, Istanbul, Turkey, June 11-15, 2006.
 12. Syed A. Khayam, Shirish Karande, **Muhammad U. Ilyas**, and Hayder Radha, "Improving Wireless Multimedia Quality using Header Detection with Priors," *IEEE International Conference on Communications (ICC'06)*, Istanbul, Turkey, June 11-15, 2006.
 13. **Muhammad Usman Ilyas**, and Hayder Radha, "End-to-End Channel Capacity of a Wireless Sensor Network Under Reachback," *40th Conference on Information Sciences and Systems (CISS'06)*, Princeton University, Princeton, NJ, United States, March 22 - 24, 2006.
 14. Syed A. Khayam, **Muhammad U. Ilyas**, Klaus Poersch, Shirish Karande, and Hayder Radha, "A Statistical Receiver-based Approach for Improved Throughput of Multimedia Communications over Wireless LANs," *IEEE International Conference on Communications (ICC'05)*, Seoul, South Korea, May 16-20, 2005.
 15. **Muhammad U. Ilyas** and Hayder Radha, "The Influence Mobility Model: A Novel Hierarchical Mobility Modeling Framework," *IEEE Wireless Communications and Networking Conference (WCNC'05)*, March 2005.
 16. **Muhammad U. Ilyas**, Syed A. Khayam, Muhammad O. Suleman, and Shahid Masud, "A Flexible Approach to High Level Simulation of Complex System-on-Chip," *International Bhurban Conference on Applied Sciences & Technologies (IBCAST'03)*, Bhurban, Pakistan, June 2003.
 17. **Muhammad U. Ilyas**, "A Comparison of Wireless Local Loop Technologies with Reference to their Application in Rural Areas of Pakistan," *IEEE Newsletter - Lahore Section*, 2003.
 18. **Muhammad U. Ilyas**, Syed A. Khayam, Muhammad O. Suleman, and Shahid Masud, "A Configurable Platform for Simulating Multiprocessor Based SOCs," *International Symposium Wireless Systems & Networks 2003 (ISWSN'03)*, King Fahad University of Petroleum & Minerals, Dhahran, Saudi Arabia.
 19. **Muhammad U. Ilyas** and Shoab A. Khan, "A Clustering Heuristic Algorithm for Scheduling Periodic and Deterministic Tasks on a Multiprocessor System," *IEEE International Multitopic Conference 2001 (INMIC'01)*, Lahore, Pakistan, Dec 2001.
-

Career History

-
- Research Assistant**, *Department of Electrical & Computer Engg., Michigan State University* 01/2006
to present
- Assisted my advisor in various research projects funded by Microsoft Research (MSR) and the National Science Foundation (NSF) award # CNS-0430436.
-
- Embedded Software Engineer**, *Algorithms Group, Quartics Inc, Irvine, CA, United States* 05/2006
to 09/2006
- One summer internship and one semester internship.
 - Studied designs of Quartics products and proposed enhancements. and
 - Designed on-chip clock optimization firmware for 10% power savings for Quartics QV1600 video processor. 08/2008
 - Researched and implemented various algorithms for real-time processing of low-light video. to 12/2008
 - Implemented demo application for various low-light video enhancement algorithms.
-
- Research Assistant/ Network Admin**, *Department of History, Michigan State University* 08/2004
to present
- Oversaw the History department computer support helpdesk.
 - Interpreted various computer problems to lay users.
 - Troubleshot computer and networking problems.
 - Assessed department needs and recommended purchase of new hardware and software.
 - Maintained the department's network and computing infrastructure.
-
- Design Engineer (SoC)**, *AVAZ Networks/ Communications Enabling Technologies* 12/2000
to 09/2002
- Worked directly with CTO and Manager (SoC).
 - Designed and implemented hardwired, cycle accurate simulators for various systems.
 - Designed and communicated the system-level design of the AVAZ VZM-2000 Ultra-high Density Media Processor.
 - Facilitated communication between the SoC and software divisions.
 - Managed task groups of 2-4 engineers for various tasks.
 - Designed and implemented a distributed RTOS.
 - Researched and wrote technical specifications and documented design of the AVAZ VZM-2000 media processor.
 - Prepared weekly progress reports of the task groups I supervised.
-
- Systems Engineer (Information Systems)**, *Engro (Exxon) Chemical Pakistan Ltd.* 12/1999
to 12/2000
- Filled in for the Section Head's position for 5 months. During that period I reported directly to the General Manager (Operations) and participated in daily morning meetings.
 - Maintained, monitored, planned and upgraded ECPL's corporate Windows NT4 based network infrastructure.
 - Guided management in making purchasing decisions of new network applications and equipment.
 - Supervised the helpdesk personnel.
-
- Electronics Engineer**, *East-West Infiniti (Pvt.) Ltd.* 08/1999
to 12/1999
- Product development of a GPS based Automatic Vehicle Location (AVL) System.
 - Worked with the PIC16 microcontrollers. Developed software components in Visual Basic 6.
 - Served as network administrator for the company's Ethernet LAN in the Administration and Engineering departments.
-

Skills Summary

- Skilled at learning new concepts, working well under pressure, interpreting sophisticated technical concepts for the lay user, and communicating ideas clearly and effectively.
 - Comfortable Programming in **C/C++**, Assembly Languages in Windows (**Visual Studio 2005/2008/.NET**) and Linux (**KDevelop, gcc**) environments. Hands-on experience in programming linux cluster applications using **MPI and OpenMP**. Comfortable with **TinyOS 1.1 and MS .NET Micro Framework** programming environment. Also familiar with Visual Basic, HTML.
 - Comfortable using most of Crossbow's **ZigBee/802.15.4** sensor network development platforms: **imote2, MICAz, MIB600, MIB510, Stargate, MTS300**.
 - Familiar with digital system design concepts. Designed top-level architecture of the AVAZ Networks VZM-2000, a 0.13 micron SoC. Hands-on experience with Xilinx Spartan-2 FPGA development kit. Conversant in **Verilog HDL**.
 - User knowledge of Windows (9x/NT/2000/XP) and RedHat Linux, 802.3 and 802.11b/g networking environments and business software packages.
 - Fluent in English, Urdu (Hindi) and German.
-