

MUHAMMAD USMAN

Email: usman@purdue.edu

Purdue University, School of Electrical and Computer Engineering
Mail Box # 314, 465 Northwestern Avenues, West Lafayette, IN 47907

Office: (765) 494-9212

EDUCATION:

BSc Electrical Engineering (Jan. 1999 – Dec. 2003)
University of Engineering & Technology, Lahore Pakistan

Aggregate Percentage over 4 years=87%
Class rank = 2/260.

MSc Electrical Engineering (Oct. 2003 – Feb. 2005)
University of Engineering & Technology Lahore Pakistan
Thesis Advisor: Prof. Dr. Noor M. Sheikh
Thesis Title: Performance analysis of Adpative Source Rate Control (ASRC) algorithm for VoIP.

Aggregate Percentage for course work=80%

PhD Electrical Engineering (Aug. 2005 – expected completion date 08-2009) Current CGPA=4.0/4.0
Purdue University, West Lafayette IN, USA
Thesis Advisor: Prof. Dr. Gerhard Klimeck
Thesis Title: Strain & electronic calculations in realistically scaled single and coupled quantum dot systems for optical and quantum computing applications.

TEACHING EXPERIENCE:

Assistant Professor (June 2005 – August 2005(on study leave))
Electrical & Computer Engineering Department
University of Engineering & Technology, Lahore Pakistan

Lecturer (June 2003 – June 2005)
Electrical & Computer Engineering Department
University of Engineering & Technology, Lahore Pakistan

COMPUTER SKILLS:

1. Certified programmer of **JAVA** programming language. Used JAVA language at Electrical Engineering Department of University of Engineering & Technology Lahore Pakistan to teach EE232 (Data Structures) and EE102 (Computer Programming) courses
2. Comprehensive knowledge of **C++, C, Keil** and **Assembly languages** of INTEL and MIPS architectures.
3. Experience of programming in **C** with MPI and thread libraries.
4. Used **Verilog/VHDL** hardware description language to teach EE201 (Digital Electronics) course. Simulated various hardware circuits in this language. Used Xilinx FPGA boards for the synthesis of digital circuits.
5. Hand-on experience of **MATLAB** engineering toolboxes.
6. Solid knowledge of computer networks. Implemented various networking protocols like POP3, HTTP1.1, and SMTP etc in JAVA language.
7. Used **Pajek** software for the analysis of large networks and maps.
8. Office Utility software like MS word, MS Excel, MS power point etc

SELECTED HONORS:

1. Fulbright USA Fellowship 2005 – 2009.
2. Purdue Graduate Tuition award 2007.

3. K.E. Durrani award for first position in Electrical Engineering Department, University of Engineering & Technology, Lahore Pakistan 2002.
4. Merit Scholarship from Govt. Of Pakistan 1998.

ACTIVITIES AND MEMBERSHIPS

1. Mentor Fulbright Students Purdue University, USA (since August 2006).
2. Mentor SURF Students Purdue University, USA (since June 2008).
3. Member of Network for Computational Nanotechnology, Purdue University (www.nanohub.org)
4. Student member of IEEE and APS societies.

REFERENCES:

1. Prof. Dr. Gerhard Klimeck (gecko@purdue.edu)
Electrical & Computer Engineering Department, Purdue University USA
2. Prof. Dr. Noor M. Sheikh (adstec@lycos.com)
Electrical & Computer Engineering Department, UET Lahore Pakistan

RESEARCH CONTRIBUTIONS:

My research activities focus mainly in the field of theoretical and computational Nanoelectronic with particular efforts to address technological challenges and bottlenecks and finding ways to get around. I am working on the electronic structure and strain modeling of quantum dots for optical devices and quantum computing. A number of these devices are being actively investigated as potential candidates for the building blocks in next-generation circuit/system design. My research heavily depends on the theory of condensed matter and makes use of novel numerical algorithms and state-of-the-art large-scale high-performance cluster computing for multi-million atomic simulations. I am also an active participant in developing community Nanoelectronic software packages for researchers and academicians around the globe. I am a member of Network for Computational Nanotechnology (NCN).

Book Chapter:

- [1] Shaikh Ahmed, Neerav Kharche, Rajib Rahman, Muhammad Usman, Sunhee Lee, Hoon Ryu, Hansang Bae, Steve Clark, Benjamin Haley, Maxim Naumov, Faisal Saied, Marek Korkusinski, Rick Kennel, Michael McLennan, Timothy B. Boykin, and Gerhard Klimeck , "Multimillion Atom Simulations with NEMO 3-D ", submitted to Springer Encyclopedia for Complexity, 2007.

Journal Paper:

- [1] Muhammad Usman, Hoon Ryu and Gerhard Klimeck,, "Moving towards nano-TCAD through multi-million atom quantum dot simulations matching experimental data", Submitted to IEEE Transactions on Nanotechnology, (July, 2008)
- [2] Gerhard Klimeck, Shaikh Ahmed, Neerav Kharche, Marek Korkusinski, Muhammad Usman, Marta Prada, and Timothy B. Boykin , "Atomistic Simulation of Realistically Sized Nanodevices Using NEMO 3-D: Part II - Applications", (INVITED) Special Issue on Nanoelectronic Device Modeling in IEEE Transactions on Electron Devices, Vol. 54, Issue 9, Sept. 2007 Page(s):2090 - 2099 (2007)

Conference Proceedings and Presentations:

- [1] Muhammad Usman, Hoon Ryu, Shaikh Ahmed, and Gerhard Klimeck, "Atomistic tight binding study of interband light transitions in self-assembled InAs/GaAs quantum dots", submitted to MRS fall 2008 meeting Boston.
- [2] Muhammad Usman, Dragica Vasileska, and Gerhard Klimeck, "Strain-engineered self-organized InAs/GaAs quantum dots for long wavelength applications", accepted for 29th ICPS Conference July 2008 Brazil (Poster Presentation).
- [3] Muhammad Usman, Shaikh Ahmed, and Gerhard Klimeck, "A tight binding study of strain-reduced confinement potentials in identical and non-identical InAs/GaAs vertically stacked quantum dots", accepted for 8th International IEEE Conference on Nanotechnology, 2008 (Oral presentation).
- [4] Muhammad Usman, Shaikh Ahmed and Gerhard Klimeck, "Strain and Piezoelectric effect on electronic structure of vertically stacked InAs/GaAs Quantum dots", Presented in APS March meeting 2008 New Orleans LO.
- [5] Muhammad usman, "Strain and electronic structure calculations in realistically scaled InAs/GaAs quantum dot systems", Presented in 1st NCN Student Research Symposium Purdue University, June 2008. (Invited presentation).
- [6] Shaikh Ahmed, Muhammad Usman, Neerav Kharce, Andrei Schliwa, and Gerhard Klimeck, "Atomistic Simulation of Non-Degeneracy and Optical Polarization Anisotropy in Pyramidal Quantum Dots", Proceedings of IEEE NEMS Jan 16-19, 2007, Bangkok Thailand (Oral presentation, 340 submissions, 90% acceptance, 55% oral presentations).
- [7] Shaikh Ahmed, Muhammad Usman, Clemens Heitzinger. Rajib Rahman, Andrei Schliwa, and Gerhard Klimeck, "Symmetry Breaking and Fine Structure Splitting in Self-Assembled Zincblende Quantum Dots: Atomistic Simulations of Long-Range Strain and Piezoelectric Field", proceedings of the 28th International Conference on the Physics of Semiconductors, ICPS 2006, Vienna, Austria, July 24-28 2006, AIP Conference Proceedings Volume 893, pg 849 (Poster presentation).
- [8] Muhammad Usman, Shaikh Ahmed, Marek Korkusinski, Clemens Heitzinger, and Gerhard Klimeck, "Strain and electronic structure interactions in realistically scaled quantum dot stacks", proceedings of the 28th International Conference on the Physics of Semiconductors, ICPS 2006, Vienna, Austria, July 24-28 2006, AIP Conference Proceedings Volume 893, pg. 847 (Poster presentation).
- [9] Gerhard Klimeck, Shaikh Ahmed, Clemens Heitzinger, Neerav Kharce, Muhammad Usman, Mathieu Luisier, Raseong Kim, Neophytos Neophytou, Michael McLennan, and Timothy B. Boykin, "Quantum Dot, Nanowire, Bandstructure Modeling and Deployment on nanoHUB.org", International Topical Workshop "Tera- and Nano-Devices: Physics and Modeling", University of Aizu, Aizu-Wakamatsu, Japan in October 16-19, 2006 (Oral presentation).
- [10] Muhammad Usman and Noor M. Sheikh, "Performance analysis of adaptive source rate control (ASRC) algorithm for VoIP", TENCON 2005, IEEE region 10 conference Melbourne Australia Nov. 2005 Page(s):1 – 7 (poster presentation).