

Mohammad Hadi Baligh

PhD

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Education

- 2001-2006 University of Waterloo, Waterloo, Ontario, Canada
Ph.D. in Electrical Engineering, Communication Systems
GPA: 98.3/100
- 1996-1999 Sharif University of Technology, Tehran, Iran
M.Sc. in Electrical Engineering (3rd rank in a class of 20)
M.S. thesis: *Multi-user Detection in CDMA Systems in Fading Channels*
M.S. seminar: *Adaptive CDMA Decoding Schemes*
GPA: 17.63/20
- 1991-1995 Isfahan University of Technology, Isfahan, Iran
B.Sc. in Electrical Engineering, Electronics
B.S. project: *Controlling a Robot Arm with Five Degrees of Freedom*
GPA: 18.64/20 (1st rank in a class of 140)

Work Experiences

Industry

- Mar 2009-now Huawei Canada, Ottawa, ON, Canada
Senior Engineer
- Feb 2006-Mar 2009 Nortel Networks, Ottawa, ON, Canada
MIMO/OFDM designer
- **LTE and LTE-A standardization**
- **Physical layer solution design**
- **Physical layer performance evaluation**
- Nov 1999-Aug 2001 Basamad Negar Company, Tehran, Iran
Project Manager
- **DVB-T transmitter implementation**
- **DVB-S transmitter implementation**
- University
- Sep 2001-Jan 2006 University of Waterloo, Waterloo, ON, Canada
Research and Teaching Assistant

Research Experience

- MIMO/OFDM: schemes and performance evaluation
 - Analysis of the asymptotic performance of turbo codes
 - FPGA Implementation of physical layer decoders
 - Digital Video Broadcasting
 - Multi-user detection in CDMA systems
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Professional Experience

- Nortel Networks
 - Standard development
 - Proposing physical layer solutions for LTE and LTE-A standards, filing patents and analytical and numerical performance evaluation of solutions for LTE and LTE-A standards
 - MIMO transmit diversity schemes for data and control channels
 - MIMO closed loop transmission schemes
 - MIMO channel rank adaptation
 - Turbo interleaver design
 - Cooperation multi-point transmission
 - VoIP coverage
 - Advanced receiver algorithms
 - Uplink access technology
 - MIMO Channel estimation
 - DL and UL Multi-user MIMO and dirty paper coding
 - Iterative transmission schemes
 - Representing Nortel in several 3GPP meetings in 2006-2009
 - Analytical and numerical performance evaluation of physical layer aspects of WiMAX
 - Developing link level and system level MIMO-OFDM simulators for LTE and WiMAX standards
 - Physical layer solutions for very high throughput networks
 - Technical support to LTE implementation
 - Research areas
 - MIMO-OFDM solutions
 - Advanced receivers
 - Cooperation techniques for LTE standards
- University of Waterloo

- Chair of the E&CE Graduate Student Association (GSA), 2003-2004
- Implementation of LDPC decoder on FPGA
- Implementation of 4-Tx MIMO decoder on FPGA
- Basamad Negar Company
 - Implementation of ETSI DVB-T transmitter on TMS DSP
 - Target Platform: Python card with four TMS320C6201 DSP (up to 6.4 GIPS)
 - Implementation of ETSI DVB-S transmitter on Xilinx FPGA
 - Target Platform: Xilinx 150K Spartan II FPGA

Teaching Experience

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| Fall 2001 - Fall 2005 | Teaching assistant for “Communication system” (5 times) and “Statistics and Probability”, Microprocessor systems (two times), University of Waterloo, Waterloo, Ontario, Canada. |
| Fall 1999 - Spring 2001 | Instructor for Electronics (2 times), Electrical Circuits, Microprocessors (2 times), Antennas (2 times) and Electricity and Magnetic Physics (2 times), Air University, Tehran, Iran. |
| Fall 1996 - Summer 1999 | Instructor for Electronics Lab. (8 times) and TA for “Electronics”, “Statistics and Probability” (2 times) and “Electrical Circuits”, Sharif University of Technology, Tehran, Iran. |
| Spring 1996 | Instructor for Microprocessors Lab., Isfahan University of Technology, Isfahan, Iran. |

Computer Skills

Experienced in:

- C-language
- *MATLAB*
- *VHDL*
- *Assembly for 80386, 80C51, TMS320C6xxx*

Awards

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| 2007 | Nortel Chief Technology Office Award of Distinction Recognizing Innovation, LTE 3GPP technology. |
| 2005 | Nortel Networks Institute Research Excellence Award. |

- 2004 CITO Student Research Excellence Scholarship Award, \$5000.
- 2003-2004 Ontario Graduate Scholarship (OGS) as an international student, \$15000 (each year, only 60 international students in Ontario receive this scholarship).
- 2002 Faculty of Engineering Award, University of Waterloo, Winter, Spring and Fall 2002.
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Honors

- 1999 MSc Degree with the honor of the 3rd rank from Sharif University of Technology
- 1996 2nd Rank in The First Iranian Students Olympiad on Electrical Engineering, Uromia, IRAN (among 5000 participants countrywide)
- 1996 1st Rank in the Iranian Graduate Entrance Exam in Electrical Engineering (among 5000 participants country-wide)
- 1996 BSc Degree with the honor of the 1st rank from Isfahan University of Technology
- 1992 The 22nd Rank in the Iranian Global Entrance Exam of Universities (among 300000 participants countrywide)
- 1991 Rank 13th in the 4th Iranian Students Olympiad on Physics (among 10000 participants countrywide)
- 1990 Rank 31st in the 8th Iranian Students Olympiad on Mathematics (among 10000 participants countrywide)
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Publications

Journal Paper:

- [1] M. H. Baligh, A. K. Khandani and I. Bahceci, "Analysis of the Asymptotic Performance of Turbo Codes," submitted to *IEEE Transactions on Information Theory*.

Conference Papers:

- [1] M. H. Baligh, A. K. Khandani, "Asymptotic Effect of Interleaver Structure on the Performance of Turbo-codes," Conference on Information Sciences and Systems (CISS) 2002, Princeton, NJ, USA, March 2002.
- [2] M. H. Baligh, et al, "Comparison between Different Standards of Digital Terrestrial Television Broadcasting," BroadcastAsia 2001, Singapore, June 2001.

- [3] M. H. Baligh, "Adaptive Methods for Multiuser Detection in CDMA Systems," 1st Iranian Students Conference on Electrical Engineering, November 1998, Sharif university of Technology, Tehran, IRAN (In Persian).

Technical Reports:

- [1] M. H. Baligh, A. K. Khandani, "Asymptotic Effect of Interleaver Structure on the Performance of Turbo Codes," Technical report UW-E&CE #2004-03, Waterloo, Ontario, Canada, 2004.
- [2] M. H. Baligh, "Realization of DVB-S standard on Spartan2 FPGA," Basamad Negar Company, Tehran, Iran, 2001.
- [3] M. H. Baligh, "Technical Comparison between three Standards of Digital Terrestrial Video Broadcasting (ATSC, DVB-T, ISDB-T)," Basamad Negar Company, Tehran, Iran, 2000.
- [4] M. H. Baligh, "Simulation and Realization of DVB-T Standard on DSP card," Basamad Negar Company, Tehran, Iran, 2000.
- [5] Several technical contributions to 3GPP RAN1 meetings.

Theses:

- [1] M. H. Baligh, "Analysis of the Asymptotic Performance of Turbo Codes," Ph.D. Thesis, University of Waterloo, February 2006.
- [2] M. H. Baligh, "Multi-user Detection in CDMA Systems in Fading Channels," M.Sc. Thesis, Sharif University of Technology, January 1999.

Interests and Activities

MIMO/OFDM Systems and Standards, Advanced receivers, Cooperative Communications, Relays, Turbo codes, LDPC, Digital Video Broadcasting, Spread Spectrum Communications, Cellular Communications, Wireless Networks.