

Vahid Pourahmpadi

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TECHNICAL/PROFESSIONAL PROFILE

Innovative **Wireless System and Research Engineer** with comprehensive background in telecommunication industry and up-to-date knowledge of recent wireless technology developments in academia. Recognized for enhancing existing systems by effectively analyzing and adding new functionalities/features. Known as disciplined and self-motivated with a commitment to completing projects on time, often exceeding expectations. Demonstrated success in quickly learning and becoming an expert in new topics.

In-depth knowledge in theoretical and practical aspects of emerging 4G / 5G wireless technologies. Authored (co-authored) 7 US patents (published and pending) and participated in different standardization activities including preparing a number of contributions for IEEE 802.16j and 3GPP Rel.12/ 13 Study Item.

Expertise in:

5G systems, Waveform Design, Non-orthogonal access	3GPP LTE, LTE-A, , WLAN standards
Interference management/cancellation	OFDM, OFDMA, SC-FDMA, CDMA
Indoor Positioning	Machine learning
Simulations, modeling/analysis of complex systems	Patenting and standardization process
C++, Matlab, VB, and SQL server	Android programming

Patents/Publications/Honors list is attached below.

EDUCATION

Post-Doctoral Fellow, Indoor positioning November. 2011 – July 2012
Electrical and Computer Engineering Department, University of Toronto, Toronto, Canada
Project - Advanced machine learning algorithms and location estimation of indoor users (based on Wi-Fi RSS readings).

Doctor of Philosophy, Advanced wireless transmission schemes January 2006 – September 2011
Major: Electrical Engineering, University of Waterloo, Waterloo, Canada
Thesis - On the optimal transmission strategies for sources without channel state information GPA 93

Master of Science, MAC-layer analysis of MIMO WLAN networks September 2003 – December 2005
Major: Electrical Engineering, Tehran University, Tehran, Iran
Thesis - Performance improvement of wireless LAN networks with multiple antennas GPA 89

Bachelor of Science, Voice Over IP (VoIP) September 1999 – August 2003
Major: Electrical Engineering, Tehran University, Tehran, Iran
Thesis - How delay/jitter would affect VoIP networks GPA 86

PROFESSIONAL EXPERIENCE

Amirkabir University of Technology, Tehran, Iran September 2015 – now
Assistant Professor, Telecommunication Group, EE Department

Offered graduate/undergraduate courses. Initiated a new 5G Advanced Research Center (5-ARC) at the ECE department. Became a member of AUT Signal Processing Lab focusing on adapting new data analysis/learning schemes for emerging applications, e.g. indoor localization and quantitative finance.

Motorola Mobility, Chicago, IL, USA March 2014 – September 2015
Wireless Research Engineer, Wireless System Research and Standard Group

Heavily involved in study of 5G network enablers including new waveform design, Non-orthogonal Multiple access schemes and co-authored 5G related patents. Participated in the study of LTE Rel.13 Multiuser Superposition Transmission (MuST) Study item. Collaborated in further development of LTE downlink simulator.

- Developed a simulator for study/analysis of different proposed 5G waveforms (e.g. FBMC, GFDM).
- Proposed new data/channel detection/estimation scheme for GFDM-based systems.
- Completed the initial version of NOMA simulator which used to prepare contributions for MuST SI.
- Added/calibrated a few of advanced receivers to the Link-level simulator which improves the interference mitigations capability of the system.
- Participated in development and filing of 2 5G-related patents.
- Delivered 5+ internal presentations.

MMSENSE Technologies Inc., Waterloo, ON December 2013 – February 2014
Firmware Engineer, Millimeter Wave/THz Laboratory, ECE department

Worked on pilot implementation of an automotive radar system based on Avnet Spartan 6-OMAP co-processing development kit. Re-examined the interfacing procedures between the DSP board and the RF front end.

- Modified the interfacing section of the DSP program to enable control of antenna switches, low pass filters, variable gain controls, and the PLL from the DSP board.
- Developed a C program for off-line processing of the captured radar signals. The program gives extensive flexibility for developing/testing new detection/estimation algorithms.

BlackBerry Ltd., Ottawa, ON August 2012 – November 2013
Advanced Technology Group, Member, Technical Staff

Participated in the study of LTE Rel.12 Network-Assisted Interference Cancellation and Suppression (NAICS) Study Item. Collaborated in development of the LTE link-level simulator and engaged in implementation of the system-level simulator for small-cell networks. Authored (co-authored) patents and 3GPP contributions.

- Enhanced Link-level simulator, supporting LTE Rel.12 requirements, including TM9 transmission.
- Studied and implemented number of advanced receivers, including E-LMMSE-IRC, SL-SIC, ML receivers, in timely manner and prepared 5+ contributions submitted to LTE Rel.12 NAICS Study Item.
- Participated in development and filing of 6 LTE-related patents.
- Delivered 6+ internal presentations/reports.

University of Toronto, Toronto, ON November 2011 – July 2012
PostDoctoral Fellow - Research Associate, WirLab Research Laboratory, ECE department

Studied and analyzed different advanced machine learning algorithms improving accuracy of existing indoor

positioning scheme. Supported small groups of graduate/undergraduate students. Worked on Android implementation of proposed indoor positioning technique.

- Reduced training time up to 30% by proposing distance-preservative semi-supervised learning algorithm for fast radio-map estimation.
- Prepared Android implementation of indoor positioning scheme to demo algorithm to external companies.
- Provided technical advising to 2 Ph.D and 1 M.Sc. students as well as 2 undergraduate groups working on indoor positioning projects.
- Published 1 IEEE conference paper.

Research in Motion, Ottawa, ON

September 2010 – December 2010

Advanced Technology Group, Internship - Research Assistant

Contributed to development of LTE link-level simulator. Participated in patent generation.

- Enhanced LTE link-level simulator by adding functionality of LTE downlink control channel, e.g., PCFICH, PDCCH, PHICH.
- Filed 1 US patent, and delivered 4 internal presentations and technical reports.

University of Waterloo, Waterloo, ON

January 2006– September 2011

Research Assistant, CST Research Laboratory, ECE department,

Ph.D. student

Analyzed performance of relay enabled WiMAX networks (IEEE 802.16j). Studied new transmission schemes for networks without Channel State Information (CSI) at source.

- Presented a technique for finding proper locations of relays in IEEE 802.16j networks.
- Introduced an effective node assignment mechanism for IEEE 802.16j networks.
- Proposed the optimal transmission scheme for multi-hop networks with no CSI at each hop transmitter.
- Designed the optimal multilayer code for single-user MIMO systems.
- Proposed a scheme that achieves the maximum Degrees of Freedom (DoF) of a random access network without any central controller.
- Published 4 IEEE journal and 4 IEEE conference papers.

Research in Motion, Waterloo, ON

September 2009– December 2009

Advanced Technology Group, Internship - Research Assistant

Studied how the antenna pattern can be modeled in an LTE link-level simulator.

- Developed an integrated LTE channel model simulator capable of channel modeling incorporating the actual 3D pattern of the TX, RX antennas. Used by antenna design team to see the link-level performance of design.
- Delivered 1 presentation and 3 internal reports.
- Published 2 IEEE conference papers.

UW JOINT WORK WITH Nortel Networks, Ottawa, ON

January 2006 – June 2008

Part-time Industrial Researcher

During Ph.D.

Studied and simulated different relaying schemes as a part of IEEE 802.16j Task Group.

- Proposed effective node assignment technique for relay-enabled WiMAX networks.
- Studied how new relaying schemes can be adapted for practical scenarios.
- Participated in IEEE 802.16j and IEEE 802.16m task groups.
- Delivered 1 IEEE contribution, 1 short tutorial and 3 internal presentations.

PUBLICATIONS

IP Portfolio and Standard Contributions

- Inventor/co-inventor of **6 granted/published U.S. patents** as well as **1 filed U.S. patent** applications. (Co-)Author of numerous contributions to 3GPP and IEEE standard meetings.

Journal Papers

- V. Pourahmadi, A. Motahari, and A. K. Khandani “Degrees of Freedom of MIMO-MAC with Random Access,” *IEEE Transaction on Communications*, vol. 61, Issue 5, pp. 1956-1967, May 2013.
- V. Pourahmadi, A. Motahari, and A. K. Khandani “Multilayer codes for Broadcasting over Quasi-static Fading MIMO Networks,” *IEEE Transactions on Communications*, vol. 61, Issue 4, pp. 1573-1583, April 2013.
- V. Pourahmadi, A. Bayesteh, and A. K. Khandani “Multilayer Coding over Multi-hop Single-User Networks,” *IEEE Transactions on Information Theory*, vol. 58, Issue 8, pp. 5323-5337, August 2012.
- V. Pourahmadi, S. Fashandi, A. Saleh, and A. K. Khandani, “Relay Placement in Wireless Networks: A Study of the Underlying Tradeoffs,” *IEEE Transactions on Wireless Communications*, vol. 10, no. 5, pp. 1383-1388, May 2011.

Conference Papers

- V. Pourahmadi, S. Valaee, “Indoor Positioning and Distance-aware Graph-based Semi-supervised Learning Method,” *IEEE GLOBECOM 2012*, Anaheim, California, USA, 2012.
- V. Pourahmadi, S.A. Motahari, A.K. Khandani, “Degrees of Freedom of Two-user MIMO Networks with Random Medium Access Control Mechanism,” *IEEE International Symposium on Information Theory (ISIT 11)*, Saint Petersburg, Russia, 2011.
- V. Pourahmadi, Farzaneh Kohandani, Amin Mobasher, “On the Accuracy of Channel Modeling based on the Kronecker Product,” *Vehicular Technology Conference, 2010, VTC 2010-fall*. *IEEE 72th, Ottawa, Canada*, 2010.
- F. Kohandani, V. Pourahmadi, Q. Rao, “Link-Layer Performance of 2x2 780MHz and 2x2 2.3GHz MIMO Systems,” *IEEE AP-S/URSI 2010*, Toronto, Canada, 2010.
- V. Pourahmadi, S.A. Motahari, A.K. Khandani, “Infinite-Level codes and Single-User Slowly Fading Channels,” *IEEE International Symposium on Information Theory (ISIT 09)*, Seoul, Korea, 2009.
- V. Pourahmadi, S. Fashandi, A. Saleh, and A. K. Khandani, “On the Optimal Design of Two-Tier Wireless Relay Networks,” *11th ACM MSWiM 2008*, Vancouver, Canada, 2008.
- V. Pourahmadi, A. Bayesteh, and A. K. Khandani, “Multilevel Coding Strategy for Two-Hop Single-User Networks,” *24th Biennial Symposium on Communications*, Kingston, Canada, 2008.
- V. Pourahmadi, S.H. Jamali, M. Shiva, and R. Safavi-Naeini, “Effects of Multi-Antenna Techniques on the IEEE 802.11b Throughput in a Slow Rayleigh Fading Channel,” *Vehicular Technology Conference, 2006, VTC 2006-fall*, Montreal, Canada, 2006.
- V. Pourahmadi, S.H. Jamali, and R. Safavi-Naeini, “Impact of Multi-Antenna on the Performance of the Ad-Hoc WLAN in a Slow Rayleigh Fading Channel,” *Vehicular Technology Conference, 2006, VTC 2006-Spring*, Melbourne, Australia, 2006.
- V. Pourahmadi, S.H. Jamali, and R. Safavi-Naeini, “Saturated Throughput Analysis of the IEEE 802.11b DCF Mode in a Slow Rayleigh Fading Channel,” *Networks, 2005*. Jointly held with the 2005 IEEE 7th Malaysia International Conference on Communication, Kuala Lumpur, Malaysia, Nov. 2005.

Technical Reports (Non-Refereed Contributions)

- V. Pourahmadi, et al., “Discussion on Reference IC/IS Receivers for NAICS,” R4-132681, Research in Motion, 3GPP TSG RAN WG1 Meeting #73, Fukuoka, Japan, May 20 24, 2013.
- V. Pourahmadi, A. S. Motahari, and A.K. Khandani, “Degrees of Freedom for a Class of MIMO Networks with Random Medium Access Control Mechanism”, Library and Archives Canada Technical Report UW-ECE #2010-10, Aug. 30, 2010.
- V. Pourahmadi, A. Bayesteh, and A.K. Khandani, “Multilevel Coding Strategy for Two-Hop Single-User Networks”, Library and Archives Canada Technical Report UW-ECE #2008-01, Jan. 14, 2008.
- V. Pourahmadi, A.K. Khandani, W. Tong, and P. Zhu, “Effective Node Assignment in 2-Hop Fixed Relay Networks,” IEEE 802 Plenary Session, Session 46, November 2006, Dallas, US, 12-17 Nov. 2006.
- V. Pourahmadi, M. Sheikhan, M.E. Kalantari, “Market Study of Future Access Network Equipments”, Iran Ministry of Industries and Mines, Sep. 2005, Iran.
- H. Bannazade, H., K. Shams, V. Pourahmadi, “Initial Study of Next Generation Networks Functional Blocks,” Iran Communication Industries Inc., Nov. 2004, Iran.
- V. Pourahmadi, H. Shariati, H., “IEEE 802.16 MAC layer Structure,” Foonon Ertebate Sayyar, Aug. 2004, Iran.

HONORS AND ACCOMPLISHMENTS

- National/Provincial Level Awards :
 - NSERC Visiting Fellowships in Canadian Government Laboratories program (VF), identified as a meritorious candidate by the NSERC Selection Committee, Jun. 2013.
 - NSERC Industrial R&D Fellowships (IRDF), pre-approved by NSERC Selection Committee, Jun. 2013.
 - NSERC Visiting Fellowships in Canadian Government Laboratories program (VF), identified as a meritorious candidate by the NSERC Selection Committee, Jun. 2010.
 - Ontario Graduate Scholarship (OGS), Canada, May 2010.
 - Member of IEEE 802.16 Working Group, Jun. 2007 Jun. 2008.
 - Ranked 23rd/8000 in Iranian National Entrance Exam for Graduate Study, Iran, 2003.
 - Ranked 123rd/300,000 in Iranian National University Entrance Exam, Iran, 1999.
- Institutional Level Awards :
 - University of Waterloo Presidents Graduate Scholarship (PGS), University of Waterloo, May 2011.
 - ISIT Travel Award, IEEE Information Society, Jun. 2009.
 - Grad. Talk Best Speaker, University of Waterloo, Sep. Apr. 2008.
 - UW Travel Award, University of Waterloo, Jun. 2009/June 2008.
 - UW Graduate Student Scholarship, University of Waterloo, Sep. Dec. 2007.
 - Special Graduate Scholarship, University of Waterloo, May Aug. 2007.
 - Graduate Student Scholarship, University of Waterloo, Sep. Dec. 2006.
- Business and Entrepreneurship Certificates
 - Business Development and Entrepreneurship, Ontario Center of Excellence, Nov. 2011.
 - Strategic and Business Planning, Ontario Center of Excellence, Oct. 2011.
 - Networking and Communication, Ontario Center of Excellence, Mar. 2011.
 - How to Develop a Winning Market Strategy, Ontario Center of Excellence, Nov. 2011.