Mostafa **Alizadeh**

GRADUATED STUDENT OF THE UNIVERSITY OF WATERLOO · ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT
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Summary of Qualifications

- **1+ years of experience in designing wireless systems:** Using advanced wireless techniques in designing, simulating, analyzing FH and QPSK transceivers inc. physical, MAC, and link layers parameter optimization such as minimization of delay, error rate by joint coding-modulation analysis.
- **3+ years of working on cellular radio and networks:** Study of GSM, 3G, LTE, 4G standards for implementation and security flaw detection by using Wireshark, GNURadio platform in C++/Python, MIMO signal processing, multi-thread programming, noise and distortion reduction using subspace methods, and independent component analysis.
- **1+ years of radar signal processing:** Environment feature extraction using high-resolution spectral and temporal techniques for target 3D localization and tracking by using range/Doppler/angle of arrival estimations, and radar calibration.
- **2+ years of managing R & D projects:** Identifying project challenges based on the requirements and finding possible solutions through collaboration with knowledgeable experts, then developing necessary techniques and designing different tests and simulations as a feedback to improve the system performance in an iterative manner.

Professional Work Experiences

In-vehicle occupant detection
Waterloo, Canada

RESEARCH ASSISTANT AT THE UNIVERSITY OF WATERLOO FOR 4 MONTHS IN COLLABOARTION WITH **Omron tech.**   *May to August, 2019*

- Analysis, and validation of a mm-wave FMCW radar operation in a vehicle for detecting the presence of an occupant.

FMCW radar imaging
Waterloo, Canada

RESEARCH ASSOCIATE AT THE UNIVERSITY OF WATERLOO FOR 7 MONTHS   *February to August, 2019*

- Design, analysis, and development of a high-resolution mm-wave FMCW radar imaging with the MIMO and phased array techniques.
- Python software development for real-time radar signal processing and visualization by exploiting *multiprocessing*, *multithreading*, *PyQt* and *Pyqtgraph* visualizers.

System design of a Frequency Hopping (FH) Transceiver
Tehran, Iran

R & D ENGINEER FOR 6 MONTHS IN A PRIVATE COMPANY   *Spring 2015*

- Design of the whole transceiver of an FH system, simulation of hopping rate, modulation, channel coding, and data link layer.

Design of a Single-Frequency QPSK receiver
Tehran, Iran

R & D ENGINEER FOR 4 MONTHS IN A PRIVATE COMPANY   *Spring 2015*

- Simulation and study of the coarse frequency offset estimation, symbol timing recovery, PLL, phase ambiguity compensation, frame synchronization with training sequences, demodulation, and decoding.

Design of Channel Coding for Wireless communications systems
Tehran, Iran

R & D ENGINEER FOR 5 MONTHS IN A PRIVATE COMPANY   *Spring 2015*

- Study and performance comparison of different channel codings inc. trellis-based channel codes, coded modulations, linear block codes.

Design of a Continuous Phase Modulation (CPM) Synchronization and Demodulation
Tehran, Iran

R & D ENGINEER FOR 3 MONTHS   *Summer 2015*

- Designing a two-step synchronization and demodulation for detecting start of a burst and joint estimation of carrier phase/frequency offsets and sample timing recovery.

GMS security
Tehran, Iran

R & D ENGINEER FOR 15 MONTHS IN "DADE PARDAZE SHARGH"   *Fall 2015*

- Security enhancement of GSM networks, using Wireshark for the network packet analysis, and using GNURadio for data capture and analysing the GSM signal in Python and C++

Teaching Experiences

- Private Tutoring of "Advanced Calculus 1", University of Waterloo, Winter 2018.
- Teaching assistant of "Logic Circuits", University of Amirkabir, Fall 2012.
- Teaching assistant of "Communication", University of Amirkabir, Fall 2013.
- Lab Instructor of "Modern control systems", Qom University of Technology, Fall 2014.

Academic Projects

Remote sensing of human vital signs detection using a mm-wave FMCW radar
University of Waterloo

Master degree project
January 2018 - January 2019

- A novel signal processing chain is designed and tested including range profile capturing, CFAR, phase analysis, artifact elimination, breathing rate estimation, and heart rate estimation.
- Matured in: independent component analysis, harmonic and phase analysis, and micro movement detection.

Implementation of LTE physical layer using software-defined radio technique
Tehran's Polytechnic, Iran

Master degree project
Fall 2013-Fall 2014

- The transmitter was implemented with GNURadio as well as tested the LTE DL physical layer at both transmitter and receiver.
- Matured in: C++ OOP, GNURadio, multi-thread processing, MIMO algorithms and implementation.

Design, simulation and implementation of wideband envelope tracking amplifier
Tehran's Polytechnic, Iran

Bachelor degree project
Fall 2011 - Fall 2012

- A wideband switching amplifier for amplifying envelope of the signal was designed. The amplified signal was used as an input power to the amplifiers of WCDMA signals (3G) to reduce the power consumption, hence, to increase their efficiency.
- Matured in: amplification of a wideband signal from 0 to 5 MHz bandwidth at the based band, PCB design in Altium, designing a switching amplifier for a class A PA.

Using Intel NSP Library for Signal Processing
Amirkabir, Iran

Advanced systems programming course
Spring 2012

- Using an open library of intel for an optimum FFT calculation and matrix-vector operation

Estimating Velocity And Position Of A GPS Receiver With Extended Kalman Filter
Amirkabir, Iran

Random process course
Fall 2013

- Using extended Kalman filter for nonlinear state equations, we modelled and designed an estimator of velocity and position of A GPS receiver

Designing A Transceiver To Transfer An Image With A Speaker To A Microphone
Tehran's Polytechnic, Iran

Advanced Communications Course
spring 2014

- Multi-rate signal processing, modulation design, synchronization

Design Of An RF Bandpass Filter Using Capacitively- Coupled Microstrip Filters
Waterloo, Canada

Microwave and Rf Engineering Course
spring 2016

- Optimizing gap and line segment lengths for achieving a desired s11 and s21 values using ADS simulator.

Mutual Coupling Matrix Computation Of A Dipole Array Antenna
Waterloo, Canada

Computational Methods For Engineering Electromagnetics Course
Winter 2017

- Writing a Matlab code for solving MoM equations of wired antennas to calculate mutual coupling matrix between dipole elements in an array

Blind Noise Reduction For Multisensory Signals
Waterloo, Canada

Stochastic Signal Processing
Spring 2018

- Using subspace filtering together with the independent component analysis to remove noisy components and reduce the overall noise power

Education

University of Waterloo
Waterloo, Canada

Master of Science in Wireless Communications (GPA: 87/100)
Fall 2016 - January 2019

- Related coursework: "digital communications", "Fundamental of Optimization", "Nonlinear optimization", "Stochastic signal processing", "Filtering and control of stochastic systems".

Amirkabir University Of Technology (Tehran's Polytechnic)
Tehran, Iran

Master of Science in RF and wireless Communications (GPA: 17.78/20)
Fall 2012 - Fall 2014

Amirkabir University Of Technology (Tehran's Polytechnic)
Tehran, Iran

Bachelor of Science in both Communications (major) and Electronics (minor) (GPA: 17.26/20 and 17.15/20, respectively)
Fall 2008 - Fall 2012

Publications

- M. Alizadeh, G. Shaker, J. C. M. de Almeida, P. P. Morita and S. Safavi-Naeini, "**Remote monitoring of human vital signs using mm-**

wave FMCW radar," in IEEE Access. doi: 10.1109/ACCESS.2019.2912956

- M. Alizadeh, G. Shaker, S. S. Naeini, **"Experimental study on the phase analysis of FMCW radar for vital signs detection"**, 13th European Conference on Antennas and Propagation, IEEE, April 2019.
- M. Alizadeh, G. Shaker, S. S. Naeini, **"Remote Heart Rate Sensing with mm-wave Radar"**, 18th International Symposium on Antenna Technology and Applied Electromagnetics, IEEE, August 2018.
- F. Jabbarvaziri, M. Alizadeh, A. Mohammadi and A. Abdipour, **"Low-complexity method for primary synchronisation in the third generation partnership project long term evolution downlink system,"** in IET Communications, vol. 10, no. 10, pp. 1229-1235, 1 7 2016.
- M. alizadeh, M. Moosavi, A. Mohammadi, **"Subcarrier and Power Allocation with Cognitive Radio Technique in Heterogeneous Networks for Reducing Interference on Macrocells"**, The First International Conference on Signal Processing & Intelligent systems (SPIS), Amirkabir University of Technology, 2015.
- M. Alizadeh, **"Introduction to SDR and cognitive radio"**, seminars on advanced communications technology, IEEE Iran section- AUT student branch, spring 2013.

Skills

Programming	Matlab, GNURadio, Python, C/C++, VHDL, Assembly, LaTeX, Qt design, version control GIT
Computer & Web	Windows ⊞ , Linux 🐧 , Wordpress
Languages	Farsi (native), English (fluent), Arabic (fair)

Honors & Awards

2016	**Faculty of engineering (FOE)**, Selected among the ECE daperment students with high GPA	*Waterloo, Canada*
2008	**Konkoor**, Ranked 350 among more than 500,000 participants for the university entrance	*Tehran, Iran*
2010	**Elite student**, Rewarded the opportunity of second major "Electronic"	*Tehran, Iran*
2012	**Elite student**, Entering master degree directly without domestic qualification exam (Konkour)	*Tehran, Iran*