Hisham Abuella

- SUMMARY OF QUALIFICATIONS -

✧ 9+ years of research and engineering experience in wireless systems (includes PhD/MSc/Qualcomm)
✧ 4+ year of industry experience in simulation, fixed-point implementation of wireless systems, RF digital front-end, Digital Pre-Distortion, channel parameter estimation, lab bringup issues and debugging scripts.
✧ 10+ technical publications (including 1 U.S. patent).
✧ Knowledge of visible light sensing and communications, OFDM, wireless prototyping using software defined radio and raspberry-Pi, digital signal processing, RF frontend impairments, 5G baseband channel estimation, and machine learning algorithms for wireless communication.
✧ Skills on MATLAB, C, C++, LabVIEW, Python, GitHub, Visio and LaTeX.

- WORK EXPERIENCE -

Senior Modem System Engineer
Qualcomm Inc., San Diego, USA | June 2021 – now

✧ Worked with the mmWave and Sub6 Rx Digital Frontend (RxFE) teams, and contributed to channel parameter estimation for NR (New Radio) team.
✧ Developed scripts and tools for debugging RxFE lab issues and maintained parsers for legacy targets.
✧ Contributed to system documentation for the Rx Digital Frontend (RxFE) and channel parameter estimation.
✧ Supported FW, RF Sys, and SW teams during chip bring-up and assisted in debugging RxFE lab/field issues.
✧ Studied Rel18 DMRS (etype1/etype2) feature, integrated it into the system simulator (Csim) in channel estimation block to analyze gains and limitations, and enabled other teams to test it in their features.
✧ Developed an algorithm to optimize memory usage in channel estimation by implementing online downsampling on key parameter used in MMSE tap calculation
✧ Verified hardware changes and firmware instructions used in various channel estimation subblocks.
✧ Optimized noise estimation algorithm by minimizing signal leakage, enhancing overall signal to noise estimation improving channel estimation in some channel scenarios.

Graduate Research and Teaching Assistant
Oklahoma State University (OSU), USA | Jan 2017 – May 2021

✧ Investigated visible light in wireless comm., detection and sensing systems ideas as: (Vehicle speed estimation, Human vitals estimation, Gesture recognition, Occupancy estimation, Bridge vibration analysis)
✧ Developed hardware prototypes for visible light comm. and sensing projects.
✧ Implemented a prototype for vitals monitoring based on visible light sensing.
✧ Participated in preparing proposals and patents applications for visible light sensing applications.
✧ Helped in preparing SDR lab session for Digital and Wireless communication courses.

Modem System Engineer (Summer Intern)
Qualcomm Inc., San Diego, USA (Virtual) | May – Aug. 2020

✧ Optimized Volterra series parameters used in DPD without affecting the performance of the DPD.
✧ Utilized the Laguerre Expansion technique (LET) for DPD and PA modeling parameter space reduction.
✧ Compared LET with legacy algorithms in terms of complexity and performance.
✧ Tested different ANN designs for PA modeling.

Qualcomm Inc., San Diego, USA | May – Aug. 2019

✧ Worked on online Digital Pre-Distortion (DPD) block to remove the power amplifier non-linearity.
✧ Developed and simulated different approaches to improve the legacy algorithms used in the system.

- ✧ Worked on new algorithm to minimize the complexity of the Digital Pre-Distortion (DPD) block using novel signal processing and machine learning techniques.

Research and Teaching Assistant
Istanbul Sehir University, Turkey | Sept. 2014 – Dec. 2016

- ✧ Built a fading channel emulator for OFDM systems on MATLAB and LabVIEW.
- ✧ Verified the software USRP-based channel emulator with the theoretical limits.
- ✧ Participated in various other projects related to courses like implementing FFT algorithm in C++ and Automatic Modulation Classification based on KDE.

System Design (DSP) Engineer
Wasiela (Varkon Semiconductors), Egypt | Oct. 2013 – July 2014

- ✧ Learned designing and development of OFDM systems using MATLAB and C++.
- ✧ Participated in LTE system Sub-blocks modelling.
- ✧ Developed fixed-point code and architecture of the LTE system physical layer sub-blocks.

- SELECTED PUBLICATIONS AND PATENTS-

1. H. Abuella and M. K. Ozdemir, "Automatic Modulation Classification Based on Kernel Density Estimation," IEEE Canadian Journal of Electrical and Computer Engineering, vol. 39, no. 3, pp. 203-209, Summer2016.
2. H. Abuella, F. Miramirkhani, S. Ekin, M. Uysal, and S. Ahmed "ViLDAR – Visible Light Sensing Based Speed Estimation using Vehicle's Headlamps," in IEEE Transactions on Vehicular Technology, vol. 68, no.11, pp. 10406-10417, Nov. 2019.
3. H. Abuella and S. Ekin, "Non-Contact Vital Signs Monitoring Through Visible Light Sensing," in IEEE Sensors Journal, vol. 20, no. 7, pp. 3859-3870, April, 2020.
4. H. Abuella, S. Ekin, M. Uysal "System and Method for Speed Estimation, Detection and Ranging using Visible Light in Vehicles", U.S. Provisional Patent Application No. 62/541,913.
5. H. Abuella et al., "Hybrid RF/VLC Systems: A Comprehensive Survey on Network Topologies, Performance Analyses, Applications, and Future Directions," in IEEE Access, vol. 9, pp. 160402-160436, 2021.

- EDUCATION -

Ph.D. at Oklahoma State University (OSU), USA
School of Electrical and Computer Engineering (Current GPA: 4.0/4.0) | Jan. 2017 – May 2021
Tentative Thesis: "Wireless Visible Light Sensing Systems: Applications, Opportunities, and Limitations"
Advisor: Assistant Prof. Sabit Ekin
Courses: Stochastic Processes, Wireless Communication, Linear Systems, Intelligent Systems.

M.Sc. at Istanbul Sehir University, Turkey
Electronics and Computer Engineering Department (GPA: 3.95/4.0) | Sept. 2014 – Dec. 2016
Thesis: "Study on selected common wireless communication issues: Software channel emulators and Automatic Modulation Classification."
Advisor: Assistant Prof. Kemal Özdemir
Courses: DSP, Digital Communications, Estimation Theory, Machine Learning.

Pre-Master at Ain-Shams University, Egypt
Communication and Electronics Eng. Department (GPA: 4.0/4.0) | Sept. 2013 – June 2014
Courses: DSP Intro., Advanced Math.

B.Sc. at Ain-Shams University, Egypt
Communication Systems Engineering Program (GPA: 3.4/4.0) | Sept. 2008 – June 2013

Thesis: "Simulating ADHOC Cognitive Radio Network & MAC layer protocols."
Courses: Image Processing, Intro. to Machine Learning, Network Communication, Information Theory.

- S C H O L A R S H I P S ,   A W A R D S ,   A N D   G R A N T S -

✧ **May 2018:** Awarded Dr. Rao Yarlagadda Graduate Fellowship ($1000) in Electrical & Computer Engineering for 2018/2019.
✧ **Nov. 2017:** Earned a Travel grant ($500) from GPSGA at OSU in USA.
✧ **Aug. 2017:** Acquired Research grant ($2,100) from Green Student Initiative (GSI) grant for a project: "A Focus on Enhancing Energy Conservation through Occupancy Estimation" from OSU Student Government Association (SGA).
✧ **Aug. 2020:** Awarded best hack in Qualcomm Interns Hackathon.

- A C T I V I T I E S -

✧ **Fall 2017:** Presented a Poster: (H. Abuella, S. Ekin, M. Uysal, and S. Ahmed, ''Vehicle Sensing and Communications Using LED Headlamps for ITS," Oklahoma Transportation Research Day, Oct. 2017, Oklahoma City, OK.
✧ **Fall 2017, 2018:** Participated in National Lab Day as a student volunteer (LiFi demo).
✧ **Summer 2018:** Participated in preparing wireless and data communication new lab at OSU (CEAT Endeavor Labs).
✧ **Fall 2018:** Presented a poster: (H. Abuella, S. Ekin, ''Visible Light Communication and Sensing --Applications for Aerospace Industry--," Boeing Innovation Week, Nov. 2018, Oklahoma City, OK)
✧ **Summer 2020:** Participated in Qualcomm PhD series to discuss my PhD research.

- C O M P U T E R   S K I L L S -

✧ **Basic Knowledge:** Linux bash, Assembly, Embedded C
✧ **Good Knowledge:** LabVIEW, NS2, Visio, LaTeX, GitHub
✧ **Excellent Knowledge:** C/C++, Python, MATLAB

- L A N G U A G E S -

✧ **Native or bilingual proficiency:** Arabic
✧ **Professional working proficiency:** English
✧ **Basic Knowledge:** French, Turkish

- P E R S O N A L   S K I L L S -

✧ Efficient problem solver especially in hardware implementation issues.
✧ Quick learner and determined to improve myself.
✧ Experienced researcher been doing research for more than six years.
✧ Living in foreign countries and traveling experience (3 years in Turkey and 8 years in USA).

- R E F E R E N C E S   C A N   B E   P R O V I D E D   U P O N   R E Q U E S T -