

Belal S. A. Korany

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PROFILE

Multidisciplinary background in wireless communications and signal processing. Authored research papers in top venues in different research communities. Practical experience with several hardware components, e.g. WiFi NICs, and NI USRPs. Proficiency in MATLAB and C++. Strong theoretical and mathematical background.

EDUCATION

- **Ph.D.: University of California Santa Barbara, CA, USA** **2015 – 2021**
 - Electrical and Computer Engineering (GPA: 4.0/4.0)
 - Advisor: Prof. Yasamin Mostofi
- **M.Sc.: Cairo University, Egypt** **2012 – 2015**
 - Electronics and Electrical Communications Engineering (GPA: 3.9/4.0)
- **B.Sc.: Cairo University, Egypt** **2007 – 2012**
 - Communications and Computer Engineering (GPA: 3.94/4.0)

RESEARCH PROJECTS

- **Counting a Stationary Crowd using WiFi Signals** **UCSB, 2021**
 - Derived a new mathematical model for the fidgeting statistics of a crowd of stationary people, and showed how they carry vital information on crowd count.
 - Proposed a novel system, based on queuing theory, to use WiFi signals to count the number of seated people in an area based on their fidgets (the small in-place motions that people engage in while being stationary).
- **Nocturnal Seizure Detection using WiFi Signals** **UCSB, 2021**
 - Derived a new mathematical model for the WiFi signals reflected off of a human body engaged in different kinds of nocturnal sleep motions (e.g., breathing, posture adjustments, and seizures).
 - Proposed a novel system that enables WiFi signals to detect if a sleeping person is having a seizure.
 - Extensively tested the proposed approach using several experiments with simulated seizures.
- **Translating Videos to RF Signals** **UCSB, 2019-2020**
 - Proposed a method that translates videos of moving people to wireless signals (that would have been measured if the person in the video was near a WiFi device).
 - Enabled WiFi-based gym activity classification by only using online available videos from YouTube.
 - Introduced XModal-ID: a novel system that uses WiFi to determine if a person walking near a WiFi device is the same as one walking in a given video footage.
- **AoA Estimation and Human tracking Using Only WiFi Signal Power** **UCSB, 2018**
 - Proposed a novel algorithm to determine the Angle-of-Arrival (AoA) using only the received signal magnitude.
 - Validated the proposed algorithm using ground vehicles in different environments on campus.
 - Proposed a particle-filter-based algorithm to track a single person using the WiFi received power.
 - Extended the tracking algorithm to track multiple-people simultaneously.
- **Device-to-Device (D2D) Communications in Massive MIMO Networks** **Cairo Univ., 2015**
 - Proposed novel power allocation and precoding algorithms for D2D communications in Massive MIMO networks.

WORK EXPERIENCE

- **Senior Wireless R&D Engineer at Qualcomm, San Diego, CA, USA** Dec 2021 – present
- **Intern at Qualcomm, New Jersey, USA** June 2016 – Sep 2016
Recipient of the Roberto Padovani Award for outstanding interns.
 - Analyzed wireless protocols and algorithms for 5G mmWave Networks.
 - Simulated the 5G access network at link-level and system-level.
- **Wireless Application Engineer at Intel Labs, Cairo, Egypt** July 2013 – Apr 2014
 - Developed an interference mitigation solution for WiFi/LTE coexistence on Intel platforms.
- **Teaching Assistant at Cairo University, Egypt and UCSB, CA, USA** 2012 – 2016
 - Assisted in teaching courses on wireless communications, signal processing, and information theory.
 - Assisted in teaching courses on wireless communications, analog and digital communication systems, signal processing, information and coding theory, and electric circuits.

PUBLICATIONS

Patents:

- Y. Mostofi, C. R. Karanam, and **B. Korany**, “System and Method of Angle-of-Arrival Estimation, Object Localization, and Target Tracking, with Received Signal Magnitude,” Patent Application No. 62/656,050.
- A. S. Ibrahim, M. F. Marzban, and **B. S. Amin**, “Methods and devices for interference variance estimation and interference cancellation,” U.S. Patent 9,794,097, Oct 2017.

Papers: (* denotes equal contribution)

- A. Pallaprolu, **B. Korany**, and Y. Mostofi, “Wiffract: A New Foundation for RF Imaging via Edge Tracing,” in ACM International Conference on Mobile Computing and Networking (MobiCom), 2022.
- **B. Korany** and Y. Mostofi, “Nocturnal Seizure Detection Using Off-the-Shelf WiFi,” in IEEE Internet of Things (IoT) journal, 2022.
- **B. Korany** and Y. Mostofi, “Counting a Stationary Crowd Using Off-the-Shelf WiFi,” in ACM International Conference on Mobile Systems, Applications, and Services (MobiSys) 2021. (acceptance rate: 21%)
- **B. Korany**, H. Cai, and Y. Mostofi, “Multiple People Identification Through Walls Using Off-the-Shelf WiFi,” in IEEE Internet of Things (IoT) journal, vol. 8, no. 8, pp. 6963-6974, April 2021. (impact factor: 9.94)
- H. Cai*, **B. Korany***, C. R. Karanam*, and Y. Mostofi, “Teaching RF to Sense without RF Training Measurements,” in ACM proceedings on Interactive, Mobile, Wearable, and Ubiquitous Technologies (IMWUT), vol. 4, no. 4, Dec. 2020.
- **B. Korany***, C.R. Karanam*, H. Cai*, and Y. Mostofi, “XModal-ID: Using WiFi for Through-Wall Person Identification from Candidate Video Footage,” in ACM International Conference on Mobile Computing and Networking (MobiCom), 2019. (acceptance rate: 19%)
- C.R. Karanam, **B. Korany**, and Y. Mostofi, “Tracking from One Side – Multi-Person Passive Tracking with WiFi Magnitude Measurements,” in ACM International Conference on Information Processing in Sensor Networks, (IPSN), 2019. (acceptance rate: 27%)
- **B. Korany**, S. Depatla, and Y. Mostofi, “Subspace-Based Imaging Using Only Power Measurements,” in IEEE Sensor Array and Multichannel Signal Processing (SAM) Workshop, 2018.
- **B. Korany***, C. Karanam*, and Y. Mostofi, “Adaptive Near-Field Imaging with Robotic Arrays,” in IEEE Sensor Array and Multichannel Signal Processing (SAM) Workshop, 2018.
- C. R. Karanam*, **B. Korany***, and Y. Mostofi, “Magnitude-based Angle-of-Arrival Estimation, Localization, and Target Tracking,” in the ACM International Conference on Information Processing in Sensor Networks (IPSN), 2018. (acceptance rate: 27%)
- **B. S. Amin**, A. S. Ibrahim, M. H. Ismail, and H. M. Mourad “Precoding and Power Allocation Algorithms for Device-to-Device Communication in Massive MIMO Networks,” in Wireless Networks (Springer), vol. 24, no. 3, pp. 925-942, April 2018.
- **B. S. Amin**, Y. R. Ramadan, A. S. Ibrahim, and M. H. Ismail, “Power Allocation for Device-to-Device Communication Underlying Massive MIMO Multicasting Networks,” in IEEE Wireless Communications and Networking Conference (WCNC), 2015.

SELECTED PRESS AND AWARDS

- UCSB's **ECE Dissertation Fellowship**, 2021.
- Research work featured in multiple news outlets, including BBC Digital Planet, Yahoo Finance, CNET Japan, ABC Australia, and others, 2019-2021.
- Qualcomm's **Roberto Padovani Award** for interns who demonstrate extraordinary technical talent, 2016.
- Full tuition graduate **Research Assistantship** at UCSB, USA, 2016-2021.
- Full tuition graduate **Teaching Assistantship** at Cairo University, Egypt, 2012-2015.
- Full tuition undergraduate **Scholarship** at Cairo University, Egypt, 2007-2012.
- Award of **Excellence** from the Ministry of Education, Egypt, 2007.

SKILLS

Proficient in MATLAB and C++. Working experience in Python. Extensive experience with several hardware components, e.g. WiFi NICs and NI USRPs.

ACADEMIC SERVICE

Reviewer for IEEE TWC, IEEE TVT, IEEE TMC, IEEE Access, IEEE VTC, and ACM TOSN.