Belal S. A. Korany

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PROFILE

Multidisciplinary background in radio frequency (RF) sensing, wireless communications, and signal processing. Extensive theoretical and experimental research experience in novel sensing and learning for smart places. Authored research papers in top venues in different research communities. Practical experience with several hardware components, e.g. WiFi NICs, Pioneer 3-AT robots, and NI USRPs. Proficiency in MATLAB and C++. Strong theoretical and mathematical background.

EDUCATION

- **University of California Santa Barbara, CA, USA** **2015 − 2021 (Expected)**
  - Ph.D. Electrical and Computer Engineering (GPA: 4.0/4.0)
  - Research Focus: Novel Sensing and Learning Systems — Advisor: Prof. Yasamin Mostofi

- **Cairo University, Egypt** **2012 − 2015**
  - M.Sc. Electronics and Electrical Communications Engineering (GPA: 3.9/4.0)

- **Cairo University, Egypt** **2007 − 2012**
  - B.Sc. Communications and Computer Engineering (GPA: 3.94/4.0)

RESEARCH PROJECTS

- **Nocturnal Seizure Detection using WiFi Signals** **UCSB, 2020**
  - Proposed a novel system that enables WiFi signals to detect if a sleeping person is having a seizure.

- **Translating Videos to Instant RF Signals** **UCSB, 2020**
  - Proposed a method that enables training RF sensing systems with zero RF training data and by only using the available online video footage, which we showed how to translate into the RF domain.
  - Trained a WiFi sensing system for gym activity classification by only using online available videos from YouTube.

- **Through-wall Person Identification with WiFi Signals** **UCSB, 2019**
  - Introduced XModal-ID: a novel system that uses WiFi to determine if a person walking behind a wall is the same as one walking in a given video footage.
  - Extended the proposed system to simultaneously identify multiple people using their gaits and Angles-of-Arrival.
  - Extensively validated the proposed framework with several experiments.

- **AoA Estimation and Human tracking Using Only WiFi Signal Power** **UCSB, 2017**
  - 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.

SKILLS

Proficient in MATLAB and C++. Working experience in Python. Extensive experience with several hardware components, e.g. WiFi NICs, Pioneer 3-AT robots, and NI USRPs.

WORK EXPERIENCE

- **Intern at Qualcomm, New Jersey, USA**   June 16 – Sep 16
  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 13 – Apr 14
  – 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.

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)
- **B. Korany** and Y. Mostofi, "Nocturnal Seizure Detection Using Off-the-Shelf WiFi," *submitted*.
- **B. Korany**, H. Cai, and Y. Mostofi, "Multiple People Identification Through Walls Using Off-the-Shelf WiFi," in IEEE Internet of Things (IoT) journal, accepted to appear, 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 Underlaying Massive MIMO Multicasting Networks," in IEEE Wireless Communications and Networking Conference (WCNC), 2015.

SELECTED PRESS AND AWARDS

- Work on through-wall person identification featured in multiple news outlets, including BBC Digital Planet, Yahoo Finance, CNET Japan, and others, 2019.
- Qualcomm's **Roberto Padovani Award** for interns with extraordinary technical talent, 2016.
- Full tuition graduate **Research Assistantship** at UCSB, USA, 2016-present.