Pedram Kheirkhah Sangdeh

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SUMMARY

- Ph.D. student skilled in wireless networking, signal processing, and machine learning.
- Interested in design, implementation, and performance analysis of innovative protocols for 5G and beyond.
- Published a book chapter and 9 research papers in INFOCOM, Mobihoc, TON, TCOM, TVT, etc.
- prototyped two real-time solutions for blind spectrum sharing and WiFi-LTE coexistence.

TECHNICAL SKILLS

- **Core skills**: Wireless Networking, Signal Processing, Machine Learning, and Information Theory.
- **Technologies and Standards**: WLANs (802.11 ac/ax), 5G NR, LTE, and Vehicular Communication (802.11p).
- **Platforms and packages**: Python, MATLAB, PyTorch, CVX, CVXOPT, GNU Radio, and IBM CPLEX.
- **Tools**: POWDER-RENEW, USRP N210/X310, mmWave radar, 60GHz RF frontends, octoclock-g cda-2990.

EXPERIENCE

- **Digital Wireless Communications Lab, Louisville, KY** *(Aug. 2017 - Present)*
  PhD Research Fellow,
  - Prototype of a **blind spectrum sharing** solution for OFDM-based systems. See Demo
  - Prototype of a protocol enabling **Wi-Fi** APs to simultaneously serve **IoT devices**.
  - Implementation of a framework to enable downlink **NOMA in indoor WLANs**.
  - Design of a concurrent spectrum utilization scheme for **D2D** and **5G NR** communications.
  - Design and prototype of a practical **blind underlay cognitive radio network**.
  - Design of a decoder for asynchronous uplink packets in **distributed MIMO** routers.
  - Co-channel interference mitigation in **interference among densely deployed WLANs**.
  - Prototype of a real-time approach enables **LTE-WiFi coexistence**. See Demo
  - **Learning-based IoT communications** for massive connectivity and low latency.
  - Design of a low-overhead **learning-based channel sounding** in WLANs.
  - Design and operating **lab-scale networks** using USRPs, clocks, switches.
  - Design and operating **city-scale networks** using POWDER-RENEW platform.
  - Non-convex and **convex optimization** using CVX, CVXOPT, and IBM CPLEX solvers.

- **K. N. Toosi Center of Research and Technology (CreaTech)** *(Sep. 2015 - Jan. 2017)*
  Research Assistant,
  - ***Networks with alternating CSI***: Research on fundamental secrecy limits (SDoF) of X-channels, interference channels, and relay channels with synergistic channel state information.

- **Information Systems and Security LAB (ISSL)** *(Feb. 2011 - Sep. 2014)*
  Research Assistant,
  - ***Fault-Tolerant Networking***: Design energy-efficient and scalable algorithms for diagnosing faulty or malicious nodes, efficient routing, early-stop agreements, and message recovery.

- **Karaj Telecommunication Research Center (ITRC)** *(Jun. 2010 - Aug. 2010)*
  Intern
  - Experience with LTE, LTE-A, WCDMA, GSM, mobility management, and network performance.
  - Tuning and optimize performance for transceivers, power amplifiers, filter units, RF modules.

SELECTED PUBLICATIONS «See full list»

1. P. Kheirkhah Sangdeh, H. Pirayesh, A. Quadri, and H. Zeng, "A Practical Spectrum Sharing Scheme for Cognitive Radio Networks: Design and Experiments," in *IEEE/ACM Transactions on Networking*, 2020.
2. P. Kheirkhah Sangdeh, H. Pirayesh, Q. Yan, K. Zeng, W. Lou, and H. Zeng, "A Downlink NOMA Scheme for Wireless LANs," in *IEEE Transactions on Communications*, vol. 68, no. 4, pp. 2236–2250, 2020.
3. A. Quadri, H. Pirayesh, P. Kheirkhah Sangdeh, and H. Zeng, "TCCI: Taming Co-Channel Interference for Wireless LANs," in *Proc. of ACM MobiHoc*, 2020.
4. H. Pirayesh, P. Kheirkhah Sangdeh, and H. Zeng, "Coexistence of Wi-Fi and IoT Communications in WLANs," in *IEEE Internet of Things Journal*, 2020.
5. P. Kheirkhah Sangdeh, H. Pirayesh, H. Zeng and H. Li, "A Practical Underlay Spectrum Sharing Scheme for Cognitive Radio Networks," in *Proc. of INFOCOM*, Paris, France, 2019, pp. 2521–2529.
6. H. Pirayesh, P. Kheirkhah Sangdeh, and H. Zeng, "EE-IoT: An Energy-Efficient IoT Communication Scheme for WLANs," in *Proc. of INFOCOM*, Paris, France, 2019, pp. 361–369.
7. B. Barari, P. Kheirkhah Sangdeh and B. Akhbari, "Secure degrees of freedom of two-user X-channel with synergistic alternating channel state information," in *IET Information Security*, vol. 13, no. 1, pp. 54-60, 2019.

PROFESSIONAL ACTIVITIES

- **Technical Program Committee**
  - International Conference on Computers, Data Management and Technology Applications, Egypt, 2017.
  - Global Summit on Computer and Information Technology, Tunisia, Jul. 2016.
  - IEEE International Circuits and Systems Symposium, Malaysia, Sept. 2015.
  - International Conference on Signal Processing and Data Mining, Turkey, Jul. 2015.
- **Reviewer**
  - ***Journals***: IEEE Trans. Circuits Syst., IEEE Syst. J., IEEE Commun. Lett., KSII Trans. Internet Inf. Syst.
  - ***Conferences***: IEEE GLOBECOM, IEEE WCNC, IEEE ICC
- **Teaching**
  - MATLAB Programming (Fall 2019)
  - Probability and Statistics (Fall 2013)

HONORS & AWARDS

- Recipient of the best student paper award in IEEE ICEE 2015.
- Fellow of J. B. Speed School of Engineering at the University of Louisville.
- Ranked 67th among more than 270,000 participants in the nationwide entrance examination of Iranian universities, July 2006.

EDUCATION

Ph.D. in Electrical and Computer Engineering	*University of Louisville*	2017 - Present
MS in Electrical and Computer Engineering	*University of Tehran*	2011 - 2014
BS in in Electrical and Computer Engineering	*University of Science and Technology*	2006 - 2011

REFERENCE

- Dr. Huacheng Zeng, ECE Assistant Professor, huacheng.zeng@louisville.edu
- Dr. Mahtab Mirmohseni, ECE Assistant Professor, mirmohseni@sharif.edu
- Dr. Hongxiang Li, ECE Associate Professor, h.li@louisville.edu