Pedram Kheirkhah Sangdeh

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SUMMARY

- CS 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 11 research papers in TON, INFOCOM, MobiHoc, 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 Communications (802.11p).
- **Platforms and packages**: Python, MATLAB, PyTorch, CVX, CVXOPT, GNU Radio, and IBM CPLEX.

PUBLICATIONS

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. P. Kheirkhah Sangdeh, H. Pirayesh, A. Mobiny, and H. Zeng, "LB-SciFi: Online Learning-Based Channel Feedback for MU-MIMO in Wireless LANs," in *Proc. of IEEE ICNP*, 2020.
5. H. Pirayesh, P. Kheirkhah Sangdeh, and H. Zeng, "Coexistence of Wi-Fi and IoT Communications in WLANs," in *IEEE Internet of Things Journal*, 2020.
6. 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.
7. 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.
8. 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.
9. P. Kheirkhah Sangdeh and H. Zeng, "Overview of Multiplexing Techniques in Wireless Networks," In *Multiplexing*, S. Mohammady, London, UK: IntechOpen, 2019, pp. 1-15.
10. B. Barari, P. Kheirkhah Sangdeh, and B. Akhbari, "Secure Degrees of Freedom of two-user two-hop X-channel," In *proceeding of the 27th ICEE*, 2017, pp. 1911-1916.
11. P.Kheirkhah Sangdeh, M. Mirmohseni, and F. Poursabzi, "Applying the Byzantine Agreement in Wireless Sensor Networks based on clustering," In *proceeding of the 23rd ICEE*, 2015, pp. 619-624.
12. P. Kheirkhah Sangdeh, M. Mirmohseni, and M. A. Akhaee, "Blind interference alignment for three-user multi-hop SISO interference channel," *6th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops*, St. Petersburg, 2014, pp. 462-467.
13. P. Kheirkhah Sangdeh, M. Mirmohseni, and M. A. Akhaee, "Interference alignment for two-user two-hop interference X-channel with delayed and No CSIT," In *6th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops*, St. Petersburg, 2014, pp. 473-479.

EXPERIENCE

- **Digital Wireless Communications Lab, East Lansing, MI** *(Aug. 2017 - May 2020)*
  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 enabling **LTE-WiFi coexistence**. See Demo
  - **Learning-based IoT communications** for massive connectivity and low latency.
  - Design of a low-overhead **learning-based channel sounding** for WLANs.
  - Design and operating **lab-scale networks** using USRPs, clocks, switches.
  - Design and operating **city-scale networks** using POWDER-RENEW platform.

- **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.

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 Computer Science and Engineering	*Michigan Sate University*	2020 - Present
Ph.D. in Electrical and Computer Engineering	*University of Louisville*	2017 - 2020
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