Abstract:
Increased demand for wireless data traffic has resulted in a spectrum crunch. On the other hand, the energy consumption of communication networks has been constantly increasing in the past decade. While studying and enhancing the spectral efficiency (SE) of wireless systems has gained significant attention from research community, the energy efficiency (EE) of these systems has remained less explored. Approaches that address the EE at radio, link and network levels are of significant importance to avoid a possible future energy crunch in communications networks. Unlike conventional multi-antenna radios, multi-antenna single-RF (MASRF) radios are equipped with one RF chain regardless of the number of available transmitting antennas. RF chains are major sinks of energy in radios. With economizing on the RF chains, a radio can achieve higher EE compared to conventional multi-antenna radios. To utilize the full potential of the MASRF radios proper transmitter and receiver design and the signal processing associated to them need to be addressed. In this talk, we present different aspects of the transmitter and receiver design for the MASRF radios. Problems such as modulation and signal design, the use of channel state information, and low-complexity detection are discussed. In addition, we introduce the concept of multi-antenna low RF (MALRF) radios to enhance the transmission rate of the MASRF radios. At the end of the talk, we present some of the potential applications of such radios in wireless communications.

Bio:
Hamid Bahrami is an Assistant Professor at the Department of Electrical and Computer Engineering at The University of Akron, OH. His main areas of research include wireless communication, information theory, and applications of signal processing in communication. He received his Ph.D. degree in electrical engineering from McGill University, Montreal, Canada in 2008. From 2007 to 2009 and prior to joining The University of Akron, he was a scientist at Wavesat Inc. Montreal, Canada where he was leading an R&D team to develop receiver algorithms for WiMAX and LTE radios. During this period, he was a frequent attendee and contributor to WiMAX Forum – the alliance of 140 companies from 50 countries to develop the next generation of mobile broadband services. Dr. Bahrami has B.Sc. and M.Sc. degrees both in Electrical Engineering from Sharif University of Technology and University of Tehran, Iran, respectively. He has served as the Editor for the IEEE Transactions on Communications and the Transactions on Emerging Telecommunications Technologies (formerly European Transactions on Telecommunications), as the Guest Editor for The Scientific World Journal and as the Technical Program Committee member of numerous IEEE conferences including IEEE GLOBECOM and International Conference on Communications (ICC). He is currently a member of the IEEE, the IEEE Communications Society, and the IEEE Vehicular Technology Society.