Radlab Seminar

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Mona Jarrahi received her B.S in electrical engineering from Sharif University of Technology (2000) and M.S and Ph.D degree in electrical engineering from Stanford University (2003, 2007). At Stanford University, she was investigating optically assisted electronics for millimeter-wave/terahertz applications. She is currently a Research Specialist at Berkeley Sensor and Actuator Center (BSAC) working on MEMS-based tunable terahertz electronics. Her graduate studies had been supported by numerous collaborators from industry; among them include Robert Bosch, Texas Instruments, and Agilent Technologies. She is the recipient of Robert Bosch FMA fellowship. She has received the "Best Student Paper" award at the International Microwave Symposium (2007). Her professional society memberships include the Institute of Electrical and Electronics Engineers (IEEE), Optical Society of America (OSA), and the International Society for Optical Engineering (SPIE).

Multidisciplinary Solutions to Millimeter-Wave and Terahertz Electronics

After more than fifty years of integrated circuits technology development, a wide range of electromagnetic spectrum remains unexplored due to the bandwidth limitations of solid-state integrated circuits. A multidisciplinary approach based on the tools provided by areas like photonics, MEMS and nanotechnology may enable the development of new devices with enhanced performance at those frequencies. Towards this goal, in the first half of this talk, I describe an optically assisted analog-to-digital converter and an electronic switch based on spatial manipulation of photons. Broad modulation bandwidth of photons results in one order of magnitude speed enhancement over the state of the art. For the second half of this talk, I focus on a similar multidisciplinary approach for designing compact, highly tunable terahertz electronics with potential applications in communications technology, security, healthcare and bioengineering. I describe a narrowband terahertz source based on photoconductive antenna arrays with a MEMS based frequency tuning. I also describe MEMS based reconfigurable metamaterials, which open up new opportunities for high quality factor, tunable terahertz filters and modulators.