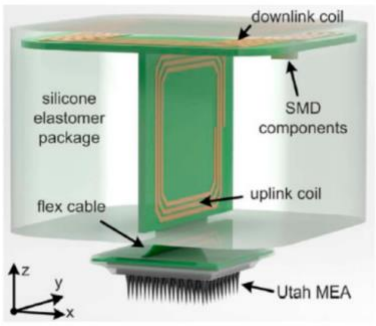
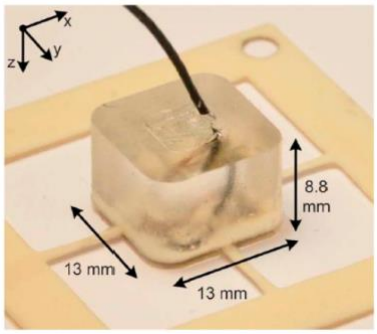
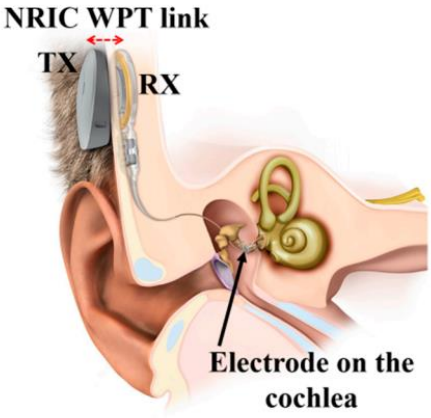
Project proposed by: **Supervisor:**	Intelligent Sensory Microsystems Laboratory, ECE, U of T Prof. Roman Genov
Project title:	**Wireless power transfer and data communication with adaptive powering circuits. (1-2 Position(s))**
Project description:	Sensory microsystems often require wire-free and battery-free operation under strict constraints of low form factor, high data rate, high energy efficiency, and low specific absorption rate. Our solutions to these challenges include low-power custom OOK and UWB radio-frequency transceivers, as well as wireless energy transfer circuits for neural recording and neurostimulation with off-chip power/data receiver coils. Our methodology also expands into involving high-frequency antenna concepts for focusing EM waves on the desired chip location. This project involves designing high-efficiency links (inductive / RF) with embedded adaptability for various environmental conditions in 65nm CMOS technology. This topic, later, would be integrated with a microwave antenna for delivering the required power to implanted chips. **Candidate Job Description** ● The candidate will design a conventional transmitting driver circuit for a coil. ● The student will design a printed circuit board to test the chips previously developed by our group. ● The student will help in the layout of complex multichannel front ends for the next generation of neural interfaces. Candidates will receive the supervision and guidance of Ph.D. students from the Intelligent Sensory Microsystems Lab. The ideal candidates are expected to have one or more of the following qualifications: ● Knowledge of inductive load drivers circuit design (For students interested in circuit design) ● Knowledge of PCB design (For students interested in PCB design). ● Knowledge of analog or digital IC design (For students interested in IC design).
Contact person:	Kindly send your email to Mohammad Abdolrazzaghi (Mohammad.abdolrazzaghi@mail.utoronto.ca), and copy to Prof. Roman Genov (roman@eecg.utoronto.ca). Please include your GPA, study program, related accomplished projects in the email along with your attached updated CV, and all of your transcripts (official or unofficial).

State-of-the-art technologies for wireless power transfer in biomedical applications

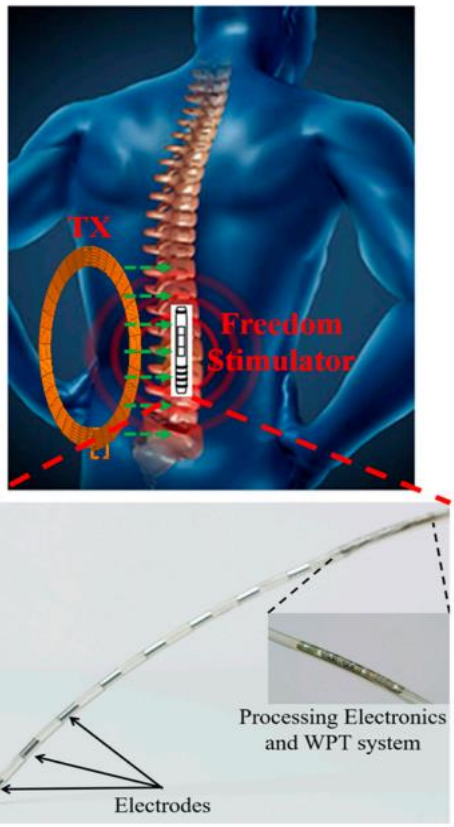




Wireless Cortical Implant



Non radiating Inductive Coupling (NRIC) Cochlear Implant



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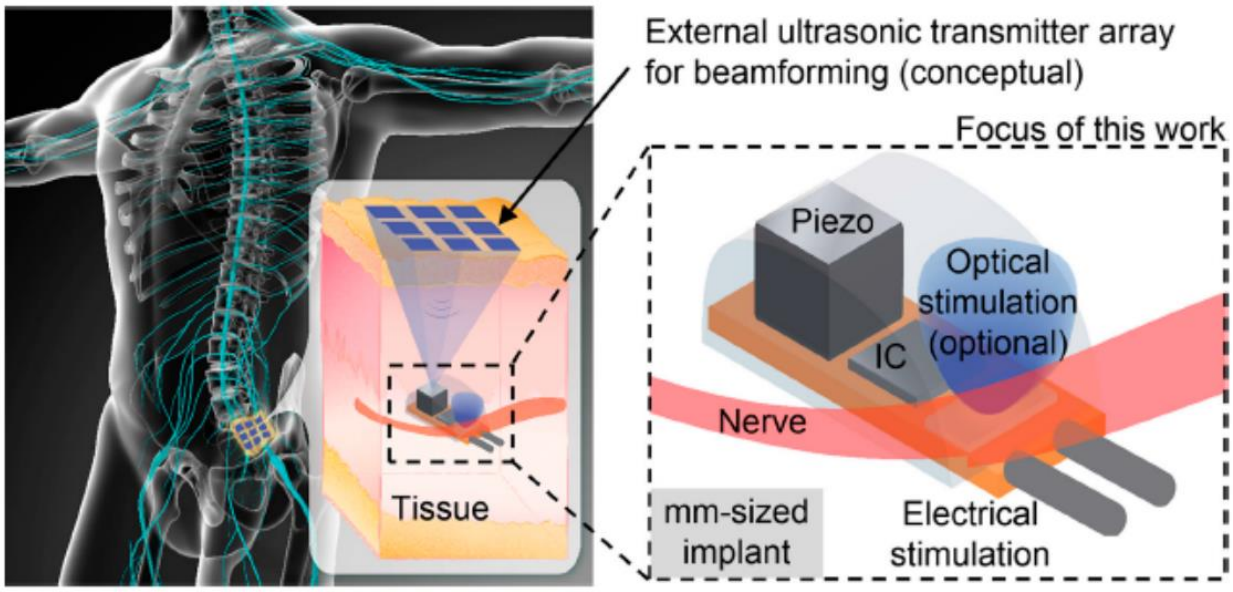

Wireless Implantable Device for Electrical Stimulation of Peripheral Nerves