# DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING PRESENTS...

## "On Real-Time Network Modulation for Intractable Epilepsy"

*Friday, March 27, 2015, 4:00 p.m. - 5:00 p.m.*
*Location: CBB Room 104*

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Epilepsy affects three million patients in the United States. In many patients with pharmacologically refractory seizures, the only effective treatment is the neurosurgical resection of abnormally synchronized hyperexcitable brain regions—the seizure onset zone. Resection carries a risk of damaging important cognitive functions, and thus creating an effective non-resective option is critical to the welfare of millions of patients.

It is now believed that the future of epilepsy research lies in building an implantable device that prevents the brain from going into a hyperactive state, similar to how a pacemaker controls abnormal heart rhythms. The implanted device should monitor the neural activity in real-time and then apply electrical stimulation designed to modulate the connectivity of the seizure network adaptively and selectively. In this presentation, we propose a paradigm to capture the dynamic, frequency dependent connectivity of the brain from real-time monitoring of the brain using ECoG (i.e., ElectroCorticoGraphy) and then identifying the "optimal" stimulation parameters to modulate the connectivity with temporal and spatial precision. In particular, we will demonstrate how we leverage from directed information, detection, and estimation to determine ideal stimulation protocols and develop a roadmap for reparative therapies.

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## Speaker Biosketch

*Behnaam Aazhang received his B.S. (with highest honors), M.S., and Ph.D. degrees in Electrical and Computer Engineering from University of Illinois at Urbana-Champaign in 1981, 1983, and 1986, respectively. In August 1985, he joined the faculty of Rice University, Houston, Texas, where he is now the J.S. Abercrombie Professor, and Chair of the Department of Electrical and Computer Engineering. In addition, he holds an Academy of Finland Distinguished Visiting Professorship appointment (FiDiPro) at the University of Oulu, Finland. His research interests are in information theory, signal processing, and their applications to wireless networks and neuro-engineering with emphasis on closed-loop real-time neuro-modulation. He is a Fellow of IEEE and AAAS, a distinguished lecturer of IEEE Communication Society, a recipient of 2004 IEEE Communication Society's Stephen O. Rice best paper award, and a recipient of IEEE Communication Society's 2013 Advances in Communication Award for the same paper. He has been listed in the Thomson-ISI Highly Cited Researchers and has been keynote and plenary speaker of several conferences.*

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