



“Real-Time Network Modulation for Intractable Epilepsy”

SAVE THE DATE!!! You have been invited to the *Electrical and Computer Engineering Seminar Series* on **Friday, April 4, 2014**. Find details of the presentation below.

When: Friday, April 4, 2014

Time: 10:00 AM - 11:00 AM

Where: FIU Engineering Center, EC 1115

Contact: 305-348-2807

Map: <http://campusmaps.fiu.edu/>

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ABSTRACT

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.

BIOGRAPHY

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.

From 1981 to 1985, he was a Research Assistant in the Coordinated Science Laboratory, University of Illinois. 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 Center for Wireless Communication (CWC) in the University of Oulu, Oulu, Finland. He has served as the founding director of Rice's Center for Multimedia Communications from 1998 till 2006. His research interests are in the areas of communication theory, information theory, signal processing, and their applications to wireless communication, wireless networks, and neuro-engineering with emphasis on closed-loop neuro-modulation and real-time brain stimulation.

Dr. Aazhang is a Fellow of IEEE and AAAS, a distinguished lecturer of IEEE Communication Society, and also a recipient of 2004 IEEE Communication Society's Stephen O. Rice best paper award for a paper with A. Sendonaris and E. Erkip. In addition, Sendonaris, Erkip, and Aazhang received 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. Most recently, he has served as the chair of the Technical Program Committee for 2005 Asilomar Conference, Monterey, CA, the co-chair of the Technical Program Committee of International Workshop on Convergent Technologies (IWCT), Oulu, Finland, June 6-10, 2005, guest editor for IEEE Journal on Selected Areas of Communication special issue on relay and cooperative communication in 2006 and for KICS Journal of Communication and Network (JCN) special issue on cooperative communication in 2007, the general chair of the 2006 Communication Theory Workshop, Dorado, Puerto Rico, the co-technical program chair of 2008 WPMC in Lapland, Finland, and the co-general chair of 2010 International Symposium on Information Theory (ISIT), in Austin, Texas.

