
**Rose F. Kennedy Intellectual and Developmental Disabilities Research Center (IDDRC)
Seminar Series**

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Towards Improved Specificity and Flexibility in EEG-based Sensory Research: Cognitive and Clinical Applications



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**Kennedy Center (Room 901)
Tuesday, April 10th, 2012, 1:00pm**

Biographical note: Dr. Edmund Lalor received the B.E. degree in Electronic Engineering from University College Dublin, Ireland in 1998 and the M.Sc. degree in Electrical Engineering from the University of Southern California in 1999. After periods working as a silicon design engineer and a primary school teacher for children with learning difficulties, Dr. Lalor joined MIT's Media Lab Europe, where he worked from 2002-2005 as a research scientist investigating brain-computer interfacing and attentional mechanisms in the brain. This led to a Ph.D. in Biomedical Engineering, which was completed through UCD in 2006. After two years as a postdoctoral research fellow at the Nathan Kline Institute for Psychiatric Research and as an adjunct assistant professor in the City College of New York, he returned to Ireland as a Government of Ireland Postdoctoral Research Fellow based at Trinity College Dublin. Following a brief stint at University College London's Institute of Ophthalmology in 2010, he returned to Trinity College Dublin in 2011 as an Assistant Professor in the School of Engineering and a Principal Investigator in the Institute of Neuroscience and the Centre for Bioengineering.

Abstract: Interpreting the electrophysiology of sensory processing in the human brain is made extremely difficult by the fact that researchers are constrained to using non-invasive recordings in human subjects. In particular, the interpretation of event-related potentials (ERPs) – which typically represent the average response in the scalp electroencephalogram (EEG) to a discrete sensory stimulus – is complicated by the fact that multiple sensory areas and multiple mechanisms contribute concurrently to the measured ERP. This restriction on the stimulus domain can result in a lack of flexibility when it comes to paradigm design, particularly when addressing certain questions about the mechanisms of human attention. Furthermore, such stimuli can result in responses that lack specificity in terms of their cellular and mechanistic origin, which can complicate the interpretation of sensory effects seen in certain clinical groups. In this talk I will outline recent work utilizing system identification methods for improving the flexibility of EEG-based selective attention research. I will also describe our recent efforts to utilize system identification for obtaining EEG responses from more specific regions of sensory cortex than can typically be done using the ERP method.