Young Innovators in Biomedical Engineering

"The challenges of measuring functional connectivity with fMRI"

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Emory Cardiology Conference Room, Woodruff Memorial Building, Room 317

Young Innovators … **is a new seminar series hosted by the assistant professors of BME. These guest speakers represent some of the best young researchers in their respective fields.**

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An increasing number of fMRI studies are looking not only at the activation of certain brain areas, but also at the connections between regions. A measure of "functional connectivity" can be inferred from the correlation of fluctuations in time, particularly those occurring at low temporal frequencies (<0.1Hz) – the hypothesis being that these signal fluctuations reflect synchronized variations in the neuronal activity of a network of regions. However, there are several challenges facing us in order to make the best use of this technique. First, there are many non-neuronal processes that can cause the fMRI signal fluctuations of two regions to be correlated, including cardiac pulsation, breathing changes, and subject motion. An accurate mapping of neuronal connections with fMRI therefore requires that these confounds be addressed. In addition, functional connectivity is often measured under quite different experimental conditions, complicating the interpretation of what precisely is giving rise to correlated fluctuations. In this talk, I will present my latest research focused on understanding and reducing correlated non-neuronal fluctuations (in particular those induced by changes in respiration), as well as determining the sources of connectivity differences between a patient population (adolescents with autism spectrum disorder) and typically developing controls.

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