1144-62-278 **Fang Han**, **Xi Chen**, **Honglang Wang*** (hlwang@iupui.edu), **Lexin Li** and **Brian Caffo**.
Robust Graph Change-point Detection for Brain Evolvement Study.

This paper studies brain structural evolvement from resting-state functional magnetic resonance imaging. The brain structure is characterized by a series of Gaussian graphical models, and we propose a robust data-driven method for inferring the structural changes of multiple graphs. The graphs correspond to different subjects, are aligned by, e.g., the ages of the subjects, and need to be estimated from the subject level data. We propose to estimate the structural changes of these graphs through a three-step procedure. First, we employ a kernel-smoothing approach to estimate multiple graphs at different ages simultaneously. Secondly, we summarize graphical information, such as the number of edges, global and local efficiency, for each estimated graph, and align them as a curve. Lastly, we propose a robust least-absolute-deviation (LAD) type penalization procedure with the fused Lasso (FL) penalty, named LAD-FL, to infer the change-points in those graph summary metrics. Our method is theoretically well understood, and results show that it could effectively capture the brain evolvement pattern. (Received August 27, 2018)