Seminar in Computer & information Science

Date: Tuesday, Jan 26, 2016
Time: 12:00 pm
Place: JMH 312
Title: Visual object representations in the human cortex: Dissimilarity analysis for model comparison

Speaker: Dr. Daniel D. Leeds, Assistant Professor,
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Abstract:
Visual object perception recruits a cortical network that is assumed to be hierarchical, progressing from basic visual features to complete object representations. However, the nature of the visual properties encoded by the cortex remains poorly understood beyond low-level pixel patterns. Conversely, the nature of semantic properties encoded by the cortex has been dominated by ability to discriminate between broad classes --- such as faces, places, or written text --- with less study of lower-level semantics. The present work engages in the identification of intermediate visual and semantic properties used to achieve object recognition in the human brain. We use sixty visual objects to elicit cortical responses from five subjects, and to compare these responses with computational vision and semantic model representations of the same objects. Using dissimilarity analysis, we identify brain regions significantly described by the SIFT computer vision algorithm, as well as brain regions significantly described by multiple mid-level semantic descriptors.

The present talk will discuss the methodology of representational dissimilarity analysis to compare cortical and computational encodings of images and will discuss the implications for ongoing studies in neuroscience and computer vision.

Bio:
Dr. Daniel D. Leeds is an assistant professor of Computer and Information Science at Fordham University. He received his PhD in Neural Computation and a Masters of Science in Robotics at Carnegie Mellon University. He received a Masters of Engineering and a Bachelors of Science in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology. Dr. Leeds is a member of the Executive Committee for the Integrative Neuroscience major at Fordham University and collaborates with other neuroscience researchers at several institutions. His research focuses on computational models of biological perception, developing techniques in machine learning, signal processing, and computer vision.