1125-VM-347 **Tiffany Jann*** (tiffanyjann@berkeley.edu) and **Erin Boggess** (erin.boggess@my.simpson.edu). *Reverse Engineering Functional Brain Networks from fMRI Data Using Probabilistic Boolean Networks.* Preliminary report.

The brain functions by communicating information across regions, and neurological diseases can alter the way these regions communicate. To characterize brain disorders and eventually propose systematic approaches to diagnosis, we should study the brain as a system and consider both its structure and dynamics. In the present work, we proposed a pipeline to reverse engineer static functional brain networks and dynamic mathematical models from fMRI data. Using probabilistic Boolean networks (PBNs) as our mathematical framework, our pipeline iterates through several steps, each with non-trivial aspects to resolve. We studied these steps using fMRI data generated from in silico networks, and successfully validated steps (1-2). For step (1), reverse engineering static functional brain network from fMRI data, we applied 44 reverse engineering methods and proposed a way to combine top-performing methods such that the result outperformed any individual method. In step (2), discretizing fMRI data into Boolean states, we proposed a novel metric to benchmark and rank 11 discretization methods. For step (3), inferring dynamical models, our preliminary studies are consistent with results from our proposed metric from step (2), and future work should focus on the validation of dynamic models. (Received August 28, 2016)