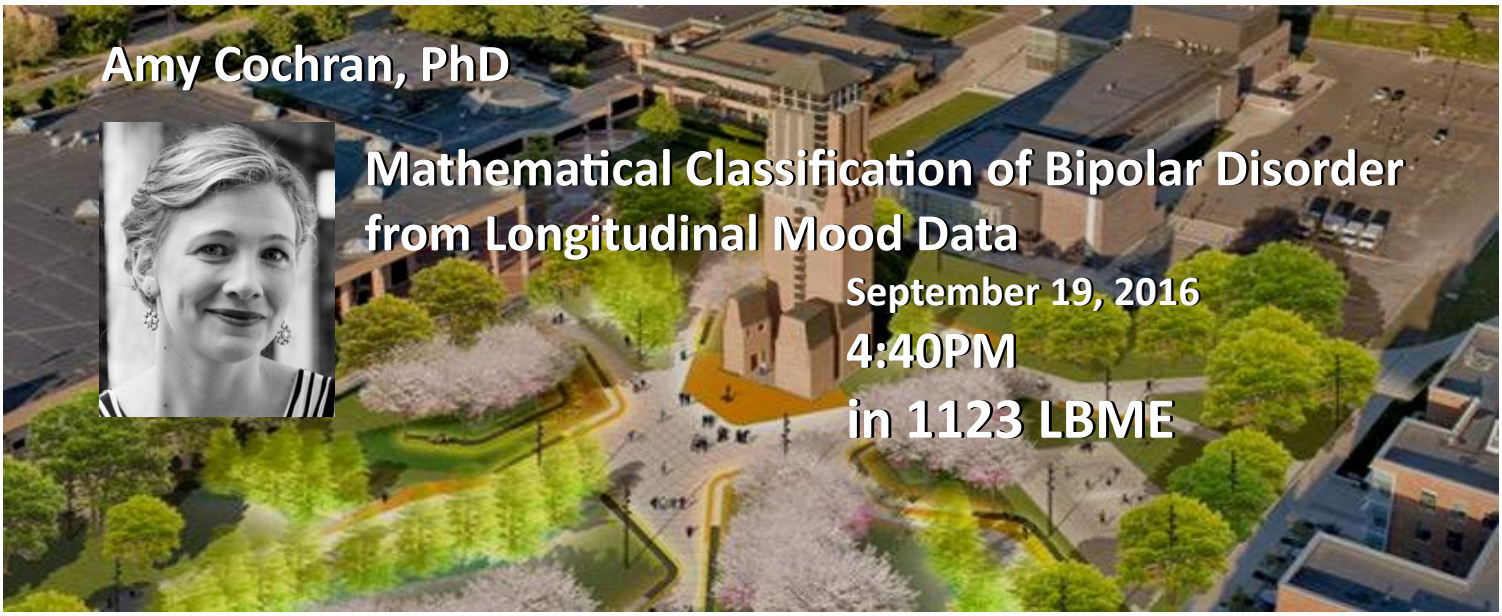

Bipolar disorder is a chronic disease of mood instability. Longitudinal patterns of mood are central to any patient description, but are condensed into simple attributes and categories. Although these provide a common language for clinicians, they are not supported by empirical evidence. In this talk, I present patient-specific models of mood in bipolar disorder that incorporate existing longitudinal data. In the first part, I will describe mood as a Bayesian nonparametric hierarchical model that includes latent classes and patient-specific mood dynamics given by discrete-time Markov chains. These models are fit to weekly mood data, revealing three patient classes that differ significantly in attempted suicide rates, disability, and symptom chronicity. In the second part of the talk, I discuss how combined statistical inferences from a population do not support widely held assumptions (e.g. mood is one-dimensional, rhythmic, and/or multistable). I then present a stochastic differential equation model that does not make any of these assumptions. I show that this model accurately describes the data and that it can be personalized to an individual. Taken together, this work moves forward data-driven modeling approaches that can guide future research into precise clinical care and disease causes.

Amy Cochran completed her Ph.D. in Applied Mathematics from Cornell University in 2013. Presently, she is a T.H. Hildebrandt Research Assistant Professor in the Mathematics Department at the University of Michigan. Her research interests are in mathematical biology, especially in computational psychiatry. She has focused on the psychiatric disorder of bipolar disorder and on describing, mathematically, the volatility of mood that is characteristic of the disorder. Additional application areas of medicine include pediatrics, emergency medicine, and obstetrics.

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