



**STAT 536D, Bayesian Inference in Latent Variable Models**  
**2019/2020, Term 2, 03/04/2020- 04/08/2020 (1 credit)**  
**Instructor: Paul Gustafson**

**Time and Place: T/TR, 9:30-11:00 ESB 4192**

**Description:** Statistical models involving latent variables are ubiquitous. They arise very naturally in many health-science applications, such as learning the properties of diagnostic tests, and inferring exposure-disease relationships when exposure cannot be measured well. Bayesian routes to inference in latent variable models are very popular, with hierarchical model specifications implemented standard Bayesian software (based on Markov Chain Monte Carlo computational methods) being quite common.

This course will explore Bayesian latent variable models in some depth. There will be a mix of applied and conceptual material. We will work through examples of specifying and fitting Bayesian models in contexts such diagnostic testing and adjusting for exposure measurement error. We will also discuss topic such as partial identification, where we dig in to the question of how the sharpness of our inferences is driven by the extent of our knowledge about the relationship between latent variables and observables. And we will review how the decision-theoretic optimality of Bayesian procedures plays out in the sorts of models we have been discussing.

**Prerequisites:** This course is open to any graduate students in the Department of Statistics. Other students should consult the instructor about suitability

**Textbook/course material:**

**References: Optional**

**Website: Optional**