

STAT 536D

STATISTICAL THEORY FOR THE DESIGN AND ANALYSIS OF CLINICAL STUDIES

2021/22 – Final third of Term 2 (1.0 credits)

“Bayesian Inference in Latent Variable Models”

Instructor: Dr. Paul Gustafson (e-mail: gustaf@stat.ubc.ca)

Lectures: Tues/Thurs 4:00 – 5:30, ESB 4192. March 15 through April 7 inclusive - eight days of Bayes!

Prerequisite: Open to any interested graduate students in the Department of Statistics. Graduate students from other departments are welcome, provided they have sufficient statistical and mathematical backgrounds (statistical theory to the level of UBC STAT 460, ideally). Students from other units should consult the instructor about suitability.

Text: There is no textbook. Readings may be suggested, ideally from texts available via the UBC library e-book collection.

Course 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 with latent variables to data, in order to solve biostatistical problems.

Lecture format: I will post “pre” versions of the lecture slides on Canvas in advance of the lecture. But these will have gaps that we will fill in together during the class.

Evaluation: Based on class participation (10%), short reflective writing exercises (20%), and, in lieu of a final exam, a final project (70%, due at the end of the April exam period). A separate document describing the reflective writing exercises and the final project will be posted.