STAT 520A – TOPICS IN BAYESIAN ANALYSIS AND DECISION THEORY
2016/17 – Second half of Term 2 (1.5 credits)
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Instructor: Dr. Paul Gustafson, e-mail: gustaf@stat.ubc.ca

Lectures: Monday, Wednesday, 13:30 -15:00, ESB 4192
Feb 20, 2017 to Apr 06, 2017

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 backgrounds (roughly, statistical theory to at least the level of UBC STAT 305, more ideally to the level of STAT 460). Students from other units should consult the instructor about suitability.

Text: Readings will be assigned, ideally from texts available via the UBC library e-book collection.

Course description: This half-term topics course is about the _operating characteristics_ of Bayesian statistical procedures. Nowadays, there are lots of software packages to implement Bayesian analyses: the user inputs the statistical model, the prior distribution, and the data, then the software outputs the posterior distribution. We are going to leave this as a black-box and not worry about the algorithms being used "under the hood." Rather, we are going to discuss how well Bayesian inference works. Examples (not an exhaustive list) of questions we will explore include:

- In what senses are Bayesian estimation procedures optimal?

- In what senses are Bayesian interval estimates useful?

- How can Bayesian procedures synthesize multiple sources of evidence?

- What are the principles and operating characteristics of Bayesian model selection procedures?

- How are Bayesian model selection and Bayesian prediction intertwined?

- What are some of the fundamental ideas around "borrowing of strength" in a Bayesian hierarchical model?

Lecture format: Mostly traditional lecturing, perhaps some small-group, in-class activities.

Evaluation: based on class participation, assignments, and a final project.