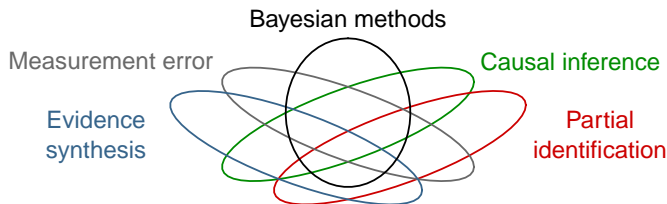# KU Leuven Summer School
# Bayesian Inference in Latent Variable Models
# Introduction

Paul Gustafson
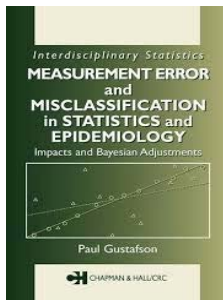
September 16, 2022

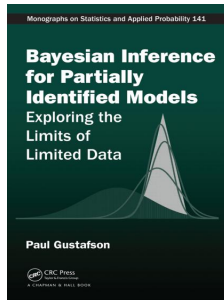# Hi there!

Since you are stuck with me for a couple of days, here's a bit of my (research) back-story.

# Books



Interdisciplinary Statistics
MEASUREMENT ERROR and MISCLASSIFICATION in STATISTICS and EPIDEMIOLOGY
Impacts and Bayesian Adjustments

Paul Gustafson

CHAPMAN & HALL/CRC

2004



Monographs on Statistics and Applied Probability 141

Bayesian Inference for Partially Identified Models
Exploring the Limits of Limited Data

Paul Gustafson

CRC Press
A CHAPMAN & HALL BOOK

2015



????

????

Bayesian Statistical Inference:
An Operating Characteristics Approach???

# What I'm hoping to convey

▶ Understanding of Bayesian (and in some cases more general) statistical principles

▶ Some simple computed examples that might be jumping-off points for more ambitious applied Bayesian work

▶ Some understanding of circumstances under which data can tell you less/more, i.e., understanding information flow

# Where I particularly worry I will fall short

- My R code (and often its graphical outputs) makes it look like I went to the graduate school in the early 1990's
- If you tell me "JAGS threw a blah-blah error message," I will be sympathetic. But I may also be challenged to get beyond "I hate when that happens!"
- If you tell me one my examples is way simpler than what you need for an applied modelling challenge you are facing, I may be challenged to get beyond nodding and grinning.
  - Sidebar about pedagogical tensions here

# My standard visceral feeling about teaching

- **In advance:** *petrified* that I haven't prepared enough material to meaningfully use all the allotted class time.
- **During:** *mystified* when I have to start rushing to make it through the material.

Will the next two days align with this prior experience???

# Note: The posted slides . . .

. . . are skimpy by design

We will annotate as we go along

# Outline

| Thursday | Friday |
|---|---|
| Intro | . |
| 1: Jumping into Bayes | 4: Diagnostic tests |
| 2(A,B,C): Latent-missing | 5(A,B): Preferential sampling |
| 3(A,B): Latent-mismeasured | 6: Bayesian calibration |
| "Lab" / "AMA" | "Lab" / "AMA" |
| . | Wrap-Up |