

# Bayesian Econometrics

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Department of Economics, University of Pretoria  
South Africa, December 6th to 9th 2011

Course webpage: <http://faculty.chicagobooth.edu/hedibert.lopes/teaching/sa2011/sa2011.html>

## Tuesday, December 6th

*8:40h-12:00h* Bayesian thinking and computation

- Prior specification, posterior inference, predictive analysis
- Model criticism, comparison and averaging
- Example: years of schooling on log wages (NLSY data)
- Monte Carlo (MC) and Markov chain Monte Carlo (MCMC) methods
- Seemingly unrelated regressions (SUR)

*13:30h-15:30h* An introduction to R via NLRM

- Revisiting the NLSY data
- Student's  $t$  regression (NLSY data)

## Wednesday, December 7th

*9:30h-11:30h* Hierarchical models

- Pooled model and individual effects model
- Random coefficients model
- Example: US airline companies
- Simple hierarchical model: WinBUGS example
- Nonlinear growth curve: R2WinBUGS example

*14:00h-16:00h* Departures from the NLRM via R

- Logistic regression (O-ring data)
- Heteroskedastic regression (simulated data)

## **Thursday, December 8th**

*8:40h-12:00h* Dynamic models

- Normal dynamic linear model (NDLM)
- Kalman filter and Kalman smoother
- Forward-filtering backward-sampling (FFBS) algorithm

*13:30h-15:30h* Dynamic models in R

- First order dynamic linear model
- Nonlinear dynamic model
- Stochastic volatility model

## **Friday, December 9th**

*8:40h-12h* Sequential Monte Carlo (SMC) methods

- Bootstrap filter (BF) and auxiliary particle filter (APF)
- Liu and West filter (LWF) and particle learning (PL)

*13:30h-15:30h* Comparing filters in R

- First order dynamic linear model: state learning
- First order dynamic linear model: state and parameter learning