

# **R. Clifton Bailey Statistics Seminar Series**

## **Parsimony inducing priors for large scale state-space models**

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**INSPER, BRAZIL**

Engineering Building 5117 - Dean's conference room  
4400 University Drive, Fairfax, VA 22030

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**Abstract:** State-space models are commonly used in the engineering, economic, and statistical literatures. They are flexible and encompass many well-known statistical models, including random coefficient autoregressive models and dynamic factor models. Bayesian analysis of state-space models has attracted much interest in recent years. However, for large scale models, prior specification becomes a challenging issue in Bayesian inference. In this paper, we propose a flexible prior for state-space models. The proposed prior is a mixture of four commonly entertained models, yet achieves parsimony in high-dimensional systems. Here “parsimony” is represented by the idea that in a large system, some states may not be time-varying. Simulation and simple examples are used throughout to demonstrate the performance of the proposed prior. As an application, we consider the time-varying conditional covariance matrices of daily log returns of the components of the S&P 100 index, leading to a state-space model with roughly five thousand time-varying states. Our model for this large system enables us to use parallel computing.

**Bio: Hedibert F. Lopes is Full Professor of Statistics and Econometrics and the founder and head of the Center for Data and Decision Sciences at Insper. He received a Ph.D. in Statistics and Decision Sciences from the Institute of Statistics and Decision Sciences of Duke University in 2000, and an MSc. in Statistics from the Mathematics Institute of the Federal University of Rio de Janeiro (UFRJ) in 1994. Prior to joining Insper in 2013, he worked for ten years at the University of Chicago as Assistant and Associate Professor of Econometrics and Statistics at the Booth School of Business. He has lectured various courses in undergraduate, masters and doctorate programs over the last two decades, such as Bayesian Econometrics, Computational Statistics and Inference Statistics (doctorate) and Business Statistics (MBA). He conducts research in Bayesian Statistics, Factorial Analysis, Computational Methods, Time Series and Dynamic Models, Multivariate Stochastic Volatility, Extreme Value Theorem, Particle Filters, Spatial Statistics, Microeconometrics and Macroeconometrics. He has published over 70 scientific papers in internationally acclaimed scientific journals such as the Journal of the American Statistical Association, Annals of Applied Statistics, Statistical Science, Statistics and Computing, Biometrics, Bayesian Analysis, Journal of Time Series Analysis, Econometric Reviews, Computational Statistics and Data Analysis and Journal of Computational and Graphical Statistics. He is Associate Editor of the Journal of Business and Economic Statistics, Bayesian Analysis and the Brazilian Journal of Probability and Statistics.**