EPICOH 2021 Pre-Conference Workshop(s) – Day 2

The Brothers Bayes' Boisterous Bootcamp - Thursday, October 21, 2021

Duration and time: 4 hours, from 12:00 to 4:00 EDT (Montreal) or 18:00-22:00 CEST (Paris).
Admission fee: $30 CND plus taxes (Bursaries are available for participants from Low- and Lower-Middle income countries. Please contact Vicki Price at vicki@f2fe.com.
Register here: https://events.eply.com/2021EPICOHWorkshops

Course Outline: This half day course will cover the fundamentals of Bayesian methods. Occupational health researchers stand to benefit from a Bayesian framework. It provides a means of integrating evidence from multiple resources and areas to come up with quantitative summaries of the health effects of different exposures. Bayesian methods are also capable of estimating health effects of multiple, co-occurring exposures, which is often of interest in complex exposure settings like the workplace.

The course will be largely didactic. It will be split into three sections. First, fundamentals of Bayesian inference will be discussed, contrasting it with frequentist approaches to statistics. Second, we will discuss the nuts and bolts of Bayesian methods, including samplers and convergence diagnostics. Finally, we will illustrate an application of Bayesian methods in R statistical software and the JAGS sampling software to demonstrate inference and common pitfalls of Bayesian methods.

Using a motivating, well known example of estimating health effects of asbestos, where exposure comprises a mixture of asbestos types and fiber lengths, attendees will be introduced to basic concepts in Bayesian data analysis. Within this example, we will describe a workflow for choosing priors, creating a model, examining sampler performance, performing inference on model parameters, and using posterior predictions to summarize joint effects of multiple components of an exposure mixture. Attendees will be given code and simulated data to follow along with the example, and a prepared worksheet with key aspects of the example will be used as a basis of discussing concepts with attendees.

Target audience: This course is best suited for students, post-docs, or anyone looking for a gentle introduction to Bayesian methods.

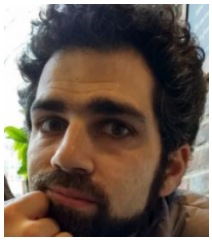
Presentation/software requirements: Attendees will not be required to have any software but will be able to run and modify the supplied code using R and JAGS software packages, both of which are freely available.

Three learning objectives: 1) understanding that Bayesian statistics are accessible to anyone, 2) appreciating that convergence diagnostics are not to be taken for granted, and 3) demonstrate a practical data analytic example that can be readily modified for exploration and adaptation to attendees' own research projects.

Presenters

Ghassan B Hamra

Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD



I am an environmental and occupational health researcher. The ultimate goal of my work is to improve population health by identifying agents that cause disease and can be removed from our environment. I am particularly interested in studying exposures as complex mixtures. This is a result of the belief that most diseases are the result of a complex process that is influenced (both negatively and positively) by a wide range of environmental contaminants, social conditions, and even products we use in day-to-day life. I employ Bayesian methods to achieve my research goals. Practically speaking, the machinery of Bayesian methods (Markov chain Monte Carlo) allows a great deal of flexibility in model specification and allows us to examine exposures as mixtures in ways that traditional statistical tools are simply incapable of handling. This comes with a computational cost (some models can take days to run), but one that can be well worth it.

Alex Keil

Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina – Chapel Hill, Chapel Hill, NC

Dr. Keil is an assistant professor of epidemiology at the University of North Carolina, Chapel Hill. His research focuses on quantifying the effect of environmental and occupational exposures on populations in a framework that packages temporal variation, population dynamics, and competing events into policy and decision-focused results. This work has focused on four primary areas: reducing bias in studies of time-varying exposures, conceptualizing population risk from exposures that can vary over time, expansion of causal inference methods to problematic data including measurement error and exposure mixtures, and estimating policy relevant quantities from observational data.