

# Introduction to Bayesian Inference using RStan



**Level:** Intermediate

**Duration:** 12 hours

Despite the promise of big data, inferences are often limited by its systematic structure. Only by carefully modelling this structure can we take full advantage of the data. Stan is a platform for facilitating this modelling, providing an expressive modelling language to implement state-of-the-art algorithms, to draw subsequent Bayesian inferences. This course will teach participants how to interface with Stan through R!



## Course Outline

- **Introduction to Bayesian inference:** A brief overview of the main ideas behind Bayesian inference.
- **Markov chain Monte Carlo methods:** A brief overview of Markov chain Monte Carlo methods for Bayesian computation and Hamiltonian Monte Carlo.
- **The Stan language:** An outline of the main components of a Stan program.
- **Using RStan:** A guide to the use of the R interface to Stan.
- **Examples:** Including linear regression, Poisson regression and hierarchical models.

## Learning Outcomes

By the end of the course participants will...

- have a good understanding of Bayesian inference/MCMC methods
- understand how these methods can be applied to their own data
- understand how to apply these methods to their own data using R's interface to Stan, RStan.

## Prior Knowledge

Participants should be familiar with basic Probability and Statistics including common distributions and regression. Basic R programming is also required, i.e. writing loops and functions. We do not expect you to have experience with Bayesian Inference or Stan, but some knowledge of the former will be helpful.

## Attendee Feedback

- "Practicals well were structured and demonstrated lots of the capabilities. Notes had plenty of details on the basics of the language and were a useful reference guide."
  - "Jack is a very competent tutor, his presentation was very well paced and was able to resolve issues and confusions quickly."
  - "I really liked the pace and the level of detail in explaining the background on day 1. The friendly pace and care on explaining every bit that is being shown is excellent to make someone at a beginner level like myself appreciate the course."

## Contact

[hello@jumpingrivers.com](mailto:hello@jumpingrivers.com)