Workshop (recommended for 1st year PhD candidates):

**Introduction to Stan: A Probabilistic Programming Language for Bayesian Inference**
(Instructor: Paul Buerkner)

This workshop offers an application-focused introduction to Bayesian statistics and the probabilistic programming language Stan ([https://mc-stan.org/](https://mc-stan.org/)). In the last couple of years, Stan has established itself as one of the main tools for specifying and estimating Bayesian models. What is more, the ecosystem of R packages that evolved around it provides a lot of functionality to conveniently specify and post-process Bayesian models fitted with Stan or other probabilistic programming languages.

In the first day of the workshop, we will cover the basics of Bayesian statistics, commonly used estimation techniques, and introduce Stan itself. We will also highlight important differences to frequentist statistics. In the second day, we will discuss more advanced topics. Depending on the preferences of the participants, we may dive deeper into the Stan language itself as well as related mathematical topics around its estimation procedures, and/or discuss and estimate more complex Bayesian models using the R package brms ([https://paul-buerkner.github.io/brms/](https://paul-buerkner.github.io/brms/)), which is a powerful high-level interface to Stan.

Throughout the workshop, hands-on exercises in R will be provided. Basic knowledge of R is required: use of functions, reading in raw data, working with objects and computing of descriptive statistics. Prior knowledge of Bayesian statistics is not expected, but may be an advantage for some of the more advanced topics.