## Efficient Bayesian approaches in Data Science

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## <u>Abstract:</u>

Bayesian approaches provide a framework for both explainable modelling, but also for decision making. The use of hierarchical models allows a simple and natural modelling which allows, e.g., to use population-level as well as individual information from multiple data sources. The model-based approaches can appropriately quantify and propagate uncertainty.

However, Bayesian inference is typically based on Markov Chain Monte Carlo methods with high computational burden. This is multiplied by the usual computational burden coming along with "big data".

Recent developments in Monte Carlo integration including approximate sampler methods can address this challenges. In particular I will introduce a Krylov subspace method for large-scale Gaussian (Markov) fields.