**Benefits of Bayesian Statistics**

Bayesian methods are gaining popularity due to a number of factors:

* The Bayesian approach allows direct probability interpretations of the parameters, given the observed data. All probability statements in the frequentist approach are about possible data that could have been observed, but were not.
* Bayesian approach uses a single tool, Bayes’ theorem, which is used in all situations. Bayes’ theorem gives the way to find the predictive distribution of future observations. There is no such general method in frequentist statistics.
* Bayesian methods often outperform frequentist methods, even when judged by frequentist criteria.
* The Bayesian approach directly addresses the question a researcher wants to answer: how information in the data modifies his or her beliefs about parameter values of a theory or model under consideration. Specifically, the approach allows computation of probabilities associated with different theories or models in the light of the data. In contrast, the standard approach seeks the inverse of that probability, the probability of data given a theory
* Bayesian statistics uses both sources of information; the prior information and sample information.
* Bayesian statistics has a straightforward way of dealing with nuisance parameters. They are always marginalized out of joint posterior distribution.
* In Bayesian statistics both prior and posterior parameters estimates are assumed to have a distribution and therefore give more realistic picture of uncertainty that is also more useful in applied work.
* Any extraneous but relevant information (e.g., results from past and/or other researchers’ studies) can be incorporated in the Bayesian method through the formulation of the prior. Such an inference process can be repeated as many times as required, and as new data is obtained, thus providing a formal tool of constantly monitoring, analyzing, and incorporating such information into inferential process (i.e., cumulative). In contrast, in the standard approach, such information is more likely to be ignored, and when incorporated is usually done in ad hoc ways.
* Bayesian statistics provides more intuitive and meaningful inferences. It gives the more direct, intuitive and meaningful statement of the probability that the hypotheses are true.
* With increased computing power and the availability of new computerized algorithms

such as Markov Chain Monte Carlo (MCMC), the solution of intractable integrals, which can sometimes be generated in Bayesian Statistics, is now possible. MCMC methods are themselves an area of active research and have allowed a more frequent use of Bayesian Statistics without the concern of confronting such an insoluble integral.