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## **Inferring the evolutionary history of a population using a Bayesian approach.**

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Genetic data can be used to understand the evolutionary history of a species or population. The advent of high-throughput genotyping technologies have made it possible to analyze a large number of genetic markers typed in multiple individuals. These massive amounts of data hold the promise of statistically rigorous inference of demographic parameters, but they also pose a challenge. To take full advantage of these data, we need to use analytical methods that can handle large amounts of data at the same time as being computationally feasible.

Bayesian approaches have several advantages, such as flexibility and speed, of which the most important is that complex likelihood functions can be computed relatively easily. Approximate Bayesian Computation (ABC) uses a rejection sampling algorithm to approximate the likelihood of the observed data under a model. The full data are summarized and are replaced by summary statistics, allowing the evaluation of an approximate likelihood.

A crucial factor in the success of ABC methods is the choice of appropriate sets of summary statistics. Some summary statistics capture the information of parameters better than others, and using too many summary statistics will make the method computationally intensive. To evaluate the performance of the summary statistics, we will simulate data under a population divergence model with fixed parameters and infer the (known) demographic parameters of this model for different combinations of summary statistics. The goal is to find the smallest and most powerful set of summary statistics that accurately estimates the model parameters.

I am looking for a highly motivated individual who is interested in population genetics and computational biology. Quantitative skills are required and proficiency in some programming language (C, perl, matlab, R) would be very useful. The results are expected to be published in a scientific journal. The research environment is international, and the working language is English.

If you are interested in this project or have any other questions, please contact me at:  
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Sincerely,

Mattias Jakobsson