



## Internship in Computational Statistics and Biological Modelling

Ecole Centrale Paris, France

### Keywords

Bayesian Inference, Generalized State-Space Model, Hidden Markov Model, Approximate Bayesian Computation, Sequential Monte Carlo, Markov Chain Monte Carlo

### Context

Digiplante is a research team of the lab of Applied Mathematics at Ecole Centrale Paris. Its focus is the mathematical modelling of plant growth, with an expertise in the development of statistical methods and algorithms for the analysis and evaluation of plant growth models.

### Objectives and Missions

Dynamical models in system biology are characterized by strongly nonlinear dynamics. The objective of the internship is to explore new statistical methods for inference in general state space models. From a methodological point of view, the objective is to develop and implement specific parameter and state estimation methods and algorithms for complex systems (characterized by several interacting submodels and a potentially large number of parameters).

More specifically, several methods of two main families will be compared:

- Information reduction (Approximate Bayesian Computation, Synthetic Likelihood...)
- State-space methods (Particle MCMC, Particle Filtering...)

The methods will be studied from both theoretical and algorithmic points of view, and tested on some specific biological models.

### Desired Profile

Master's or 'Grande Ecole' student in statistics, data sciences or applied mathematics.  
Interest for the Modelling of Biological Systems  
Experience with programming (C++)

### Location

Laboratoire de mathématiques appliquées (MAS) at Ecole Centrale Paris (CentraleSupélec)  
Grande Voie des Vignes - 92290 Châtenay Malabry (Close suburb of Paris)

### Remuneration

1200 euros net per month

### Duration

6 months, with possible funding of a PhD scholarship afterwards.  
The position will start April 2015 or as soon as possible. Open until filled.

### Contact

For further information regarding this position, please contact:

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