

Model Calibration, Bayesian Inference & MCMC — Hands-on

Learn how to calibrate systems biology models using Bayesian inference and Markov Chain Monte Carlo. This module introduces the calibration mindset, likelihood and priors, Bayesian updating, and practical MCMC workflows so that you can quantify parameter uncertainty and generate decision ready predictions.

Model Calibration, Bayesian Inference & MCMC

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Session 1

Fee: Rs 8800 [Apply Now](#)

Calibration Mindset, Likelihood & Priors

What calibration means for systems models

[parameters as uncertain quantities](#) [data, model and discrepancy view](#) [fitting vs calibration mindset](#)

Likelihood intuition for experimental data

[linking model outputs to observations](#) [simple noise models idea](#) [goodness of fit and residual thinking](#)

Priors and information sources for parameters

literature and expert knowledge | wide vs informative priors | constraints and scaling ideas

Session 2

Fee: Rs 11800 | Apply Now

Bayesian Inference Basics & Posterior Thinking

Bayesian updating conceptually

prior, likelihood and posterior | evidence as a normalizing term | posterior as updated belief

Posterior summaries and intervals

means and medians for parameters | credible intervals | intuition | joint vs marginal views

Posterior predictive thinking

simulating new data from posterior | checking model fit conceptually | prediction intervals vs parameter intervals

Session 3

Fee: Rs 14800 | Apply Now

MCMC Samplers, Workflows & Uncertainty Use

MCMC idea for exploring posteriors

Markov chains and random walks | Metropolis Hastings concept | Gibbs and gradient based ideas (high level)

Convergence and diagnostics intuition

trace plots and mixing | multiple chains and R hat idea | effective sample size awareness

Using uncertainty for decisions and design

probabilistic statements on parameters **prediction bands for trajectories** **prioritizing new experiments conceptually**

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Bayesian Calibration of a Small Model

Choose a small dynamic model and data example

theory plus guided practical

Set priors, define likelihood and run a simple MCMC workflow

parameter and data setup **run chains and check diagnostics** **summarize posterior and predictions**

Deliverables: notebook, posterior plots and short note

Python or R notebook **histograms and trace plots**
PDF or HTML project summary