

SBI Toolbox: Idea: recap

Bayesian approach to parameter estimation

$$p(\theta|X = x) = \frac{p(x|\theta)p(\theta)}{p(x)}$$

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Bayesian approach to parameter estimation

$$p(\theta|X = x) = \frac{p(x|\theta)p(\theta)}{\int p(x, \theta)d\theta}$$

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Bayesian approach to parameter estimation

$$p(\theta|X = x) = \frac{p(x|\theta)p(\theta)}{p(x)}$$

→ Numerically expensive

SBI Toolbox: Idea: recap

“Likelihood-free” approach to parameter estimation

$$p(\theta|X = x) = \frac{p(x|\theta)p(\theta)}{p(x)}$$

Unknown

Numerically expensive

The diagram illustrates the formula for the posterior probability $p(\theta|X = x)$. The numerator $p(x|\theta)p(\theta)$ is enclosed in a red box, with a red arrow pointing from it to the word "Unknown". The denominator $p(x)$ is also enclosed in a red box, with a red arrow pointing from it to the text "Numerically expensive".

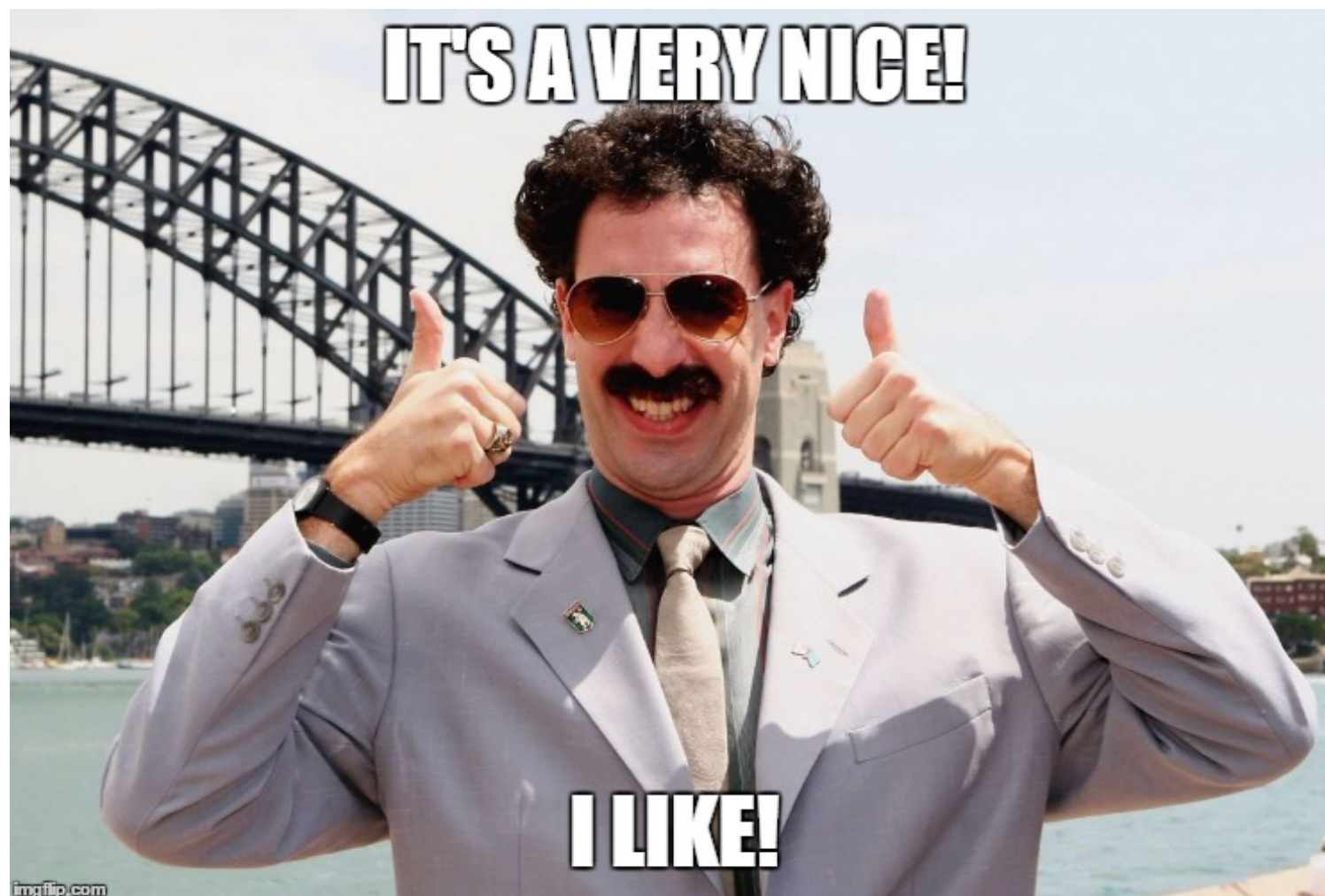
SBI Toolbox: Idea: recap

“Likelihood-free” approach to parameter estimation

$$p(\theta|X = x) = \frac{p(x|\theta)p(\theta)}{p(x)}$$

Unknown ←

→ Numerically expensive



SBI Toolbox: Idea: recap

“Simulation-based” approach to parameter estimation

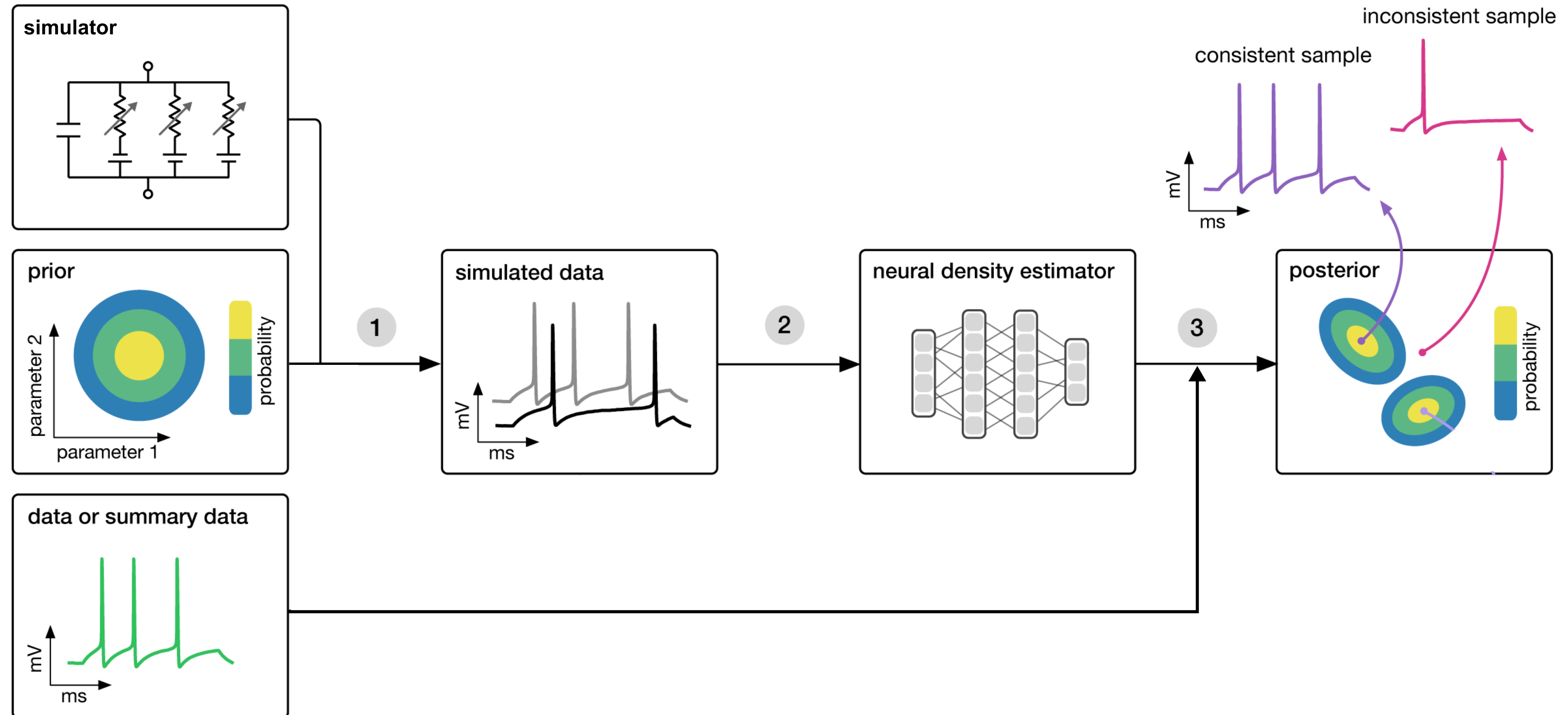
(redefined)

$$p(\theta | X = x) = \frac{p(x|\theta)p(\theta)}{p(x)}$$

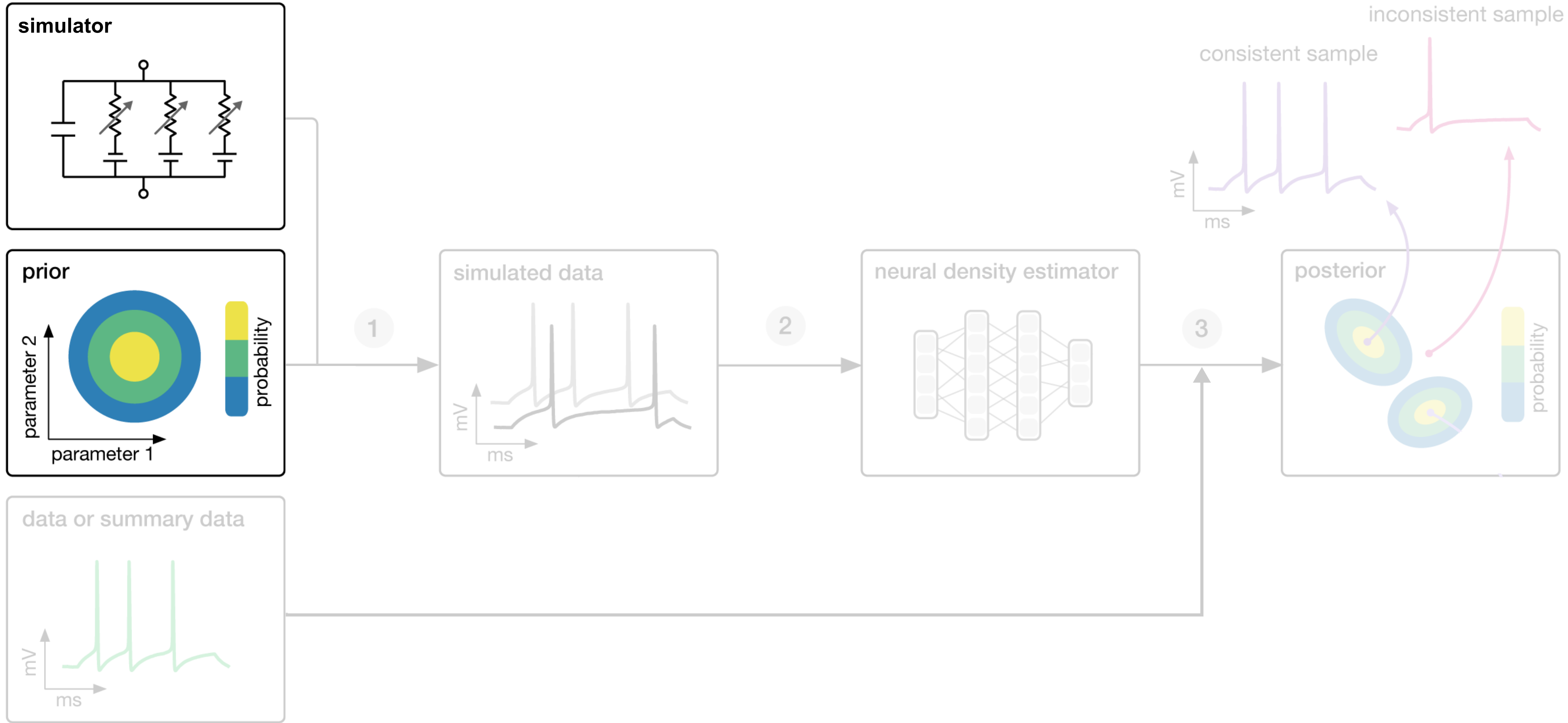
Simulate ←

→ **Numerically expensive**

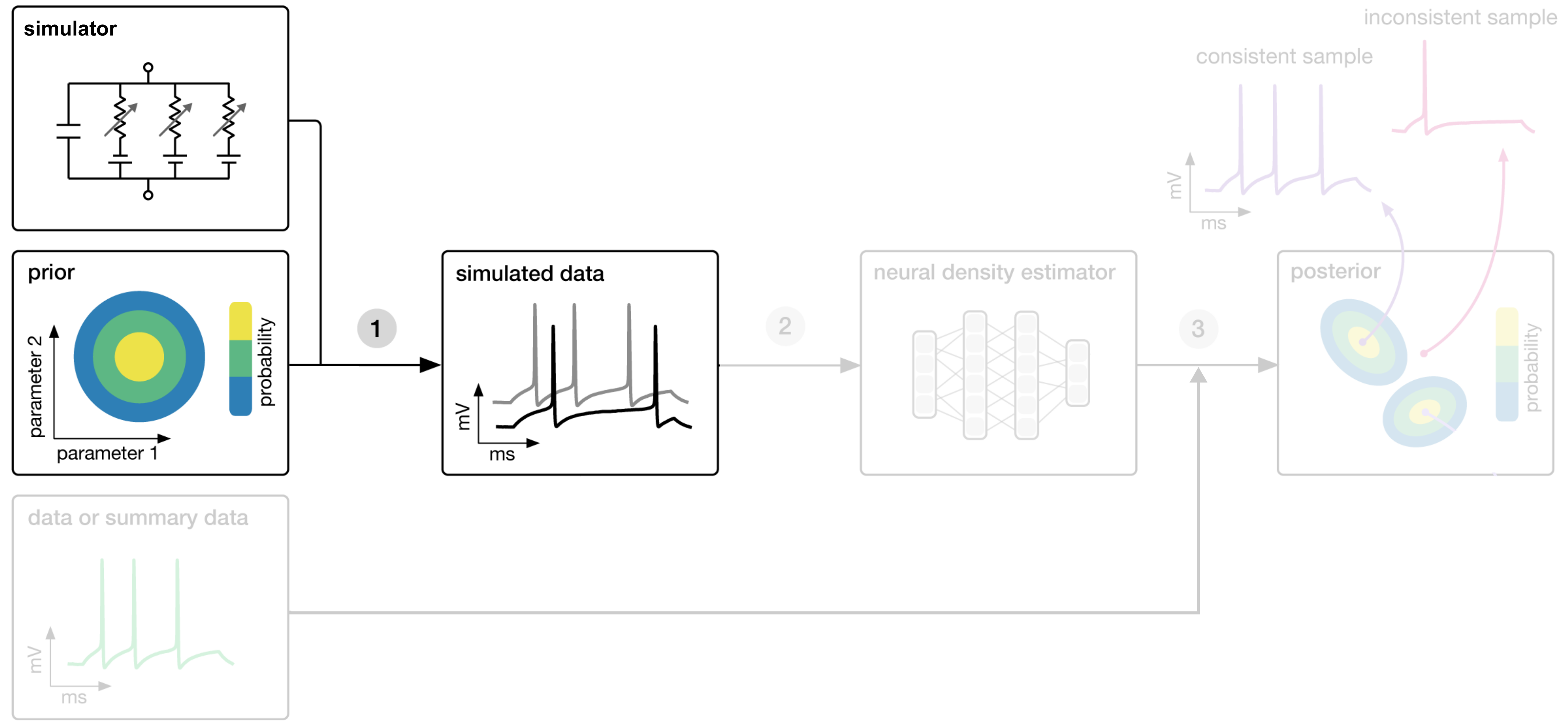
SBI Toolbox: overview



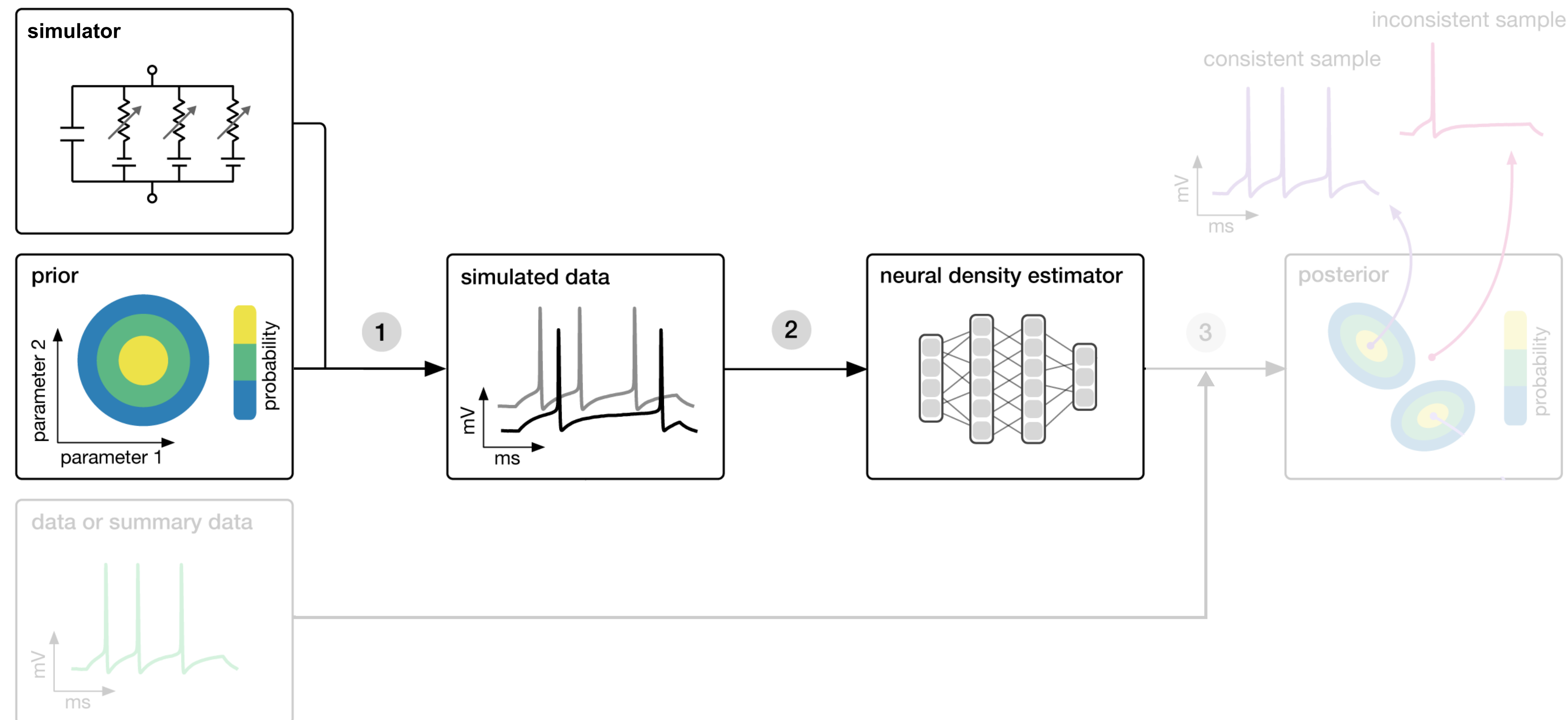
0. Basic ingredients 🍰



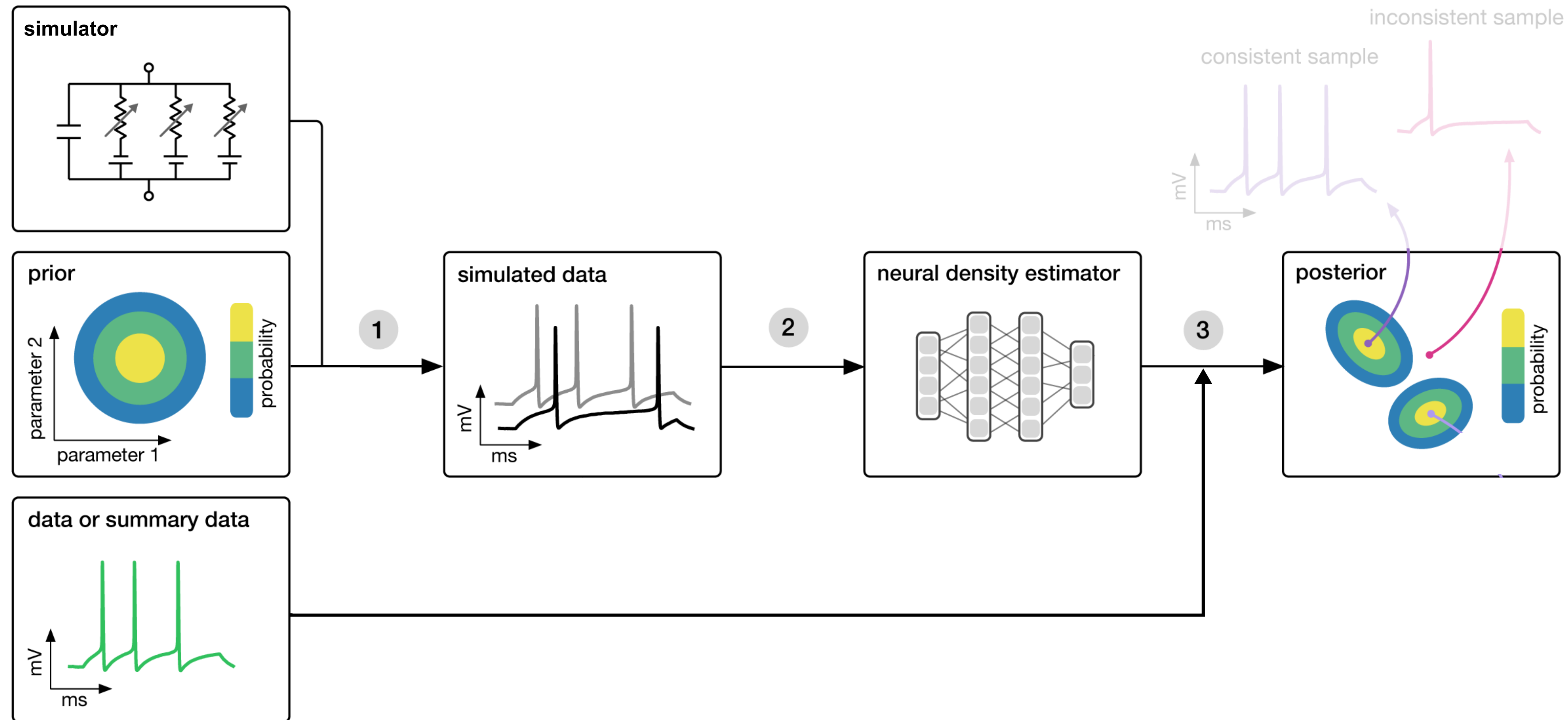
1. Simulate data



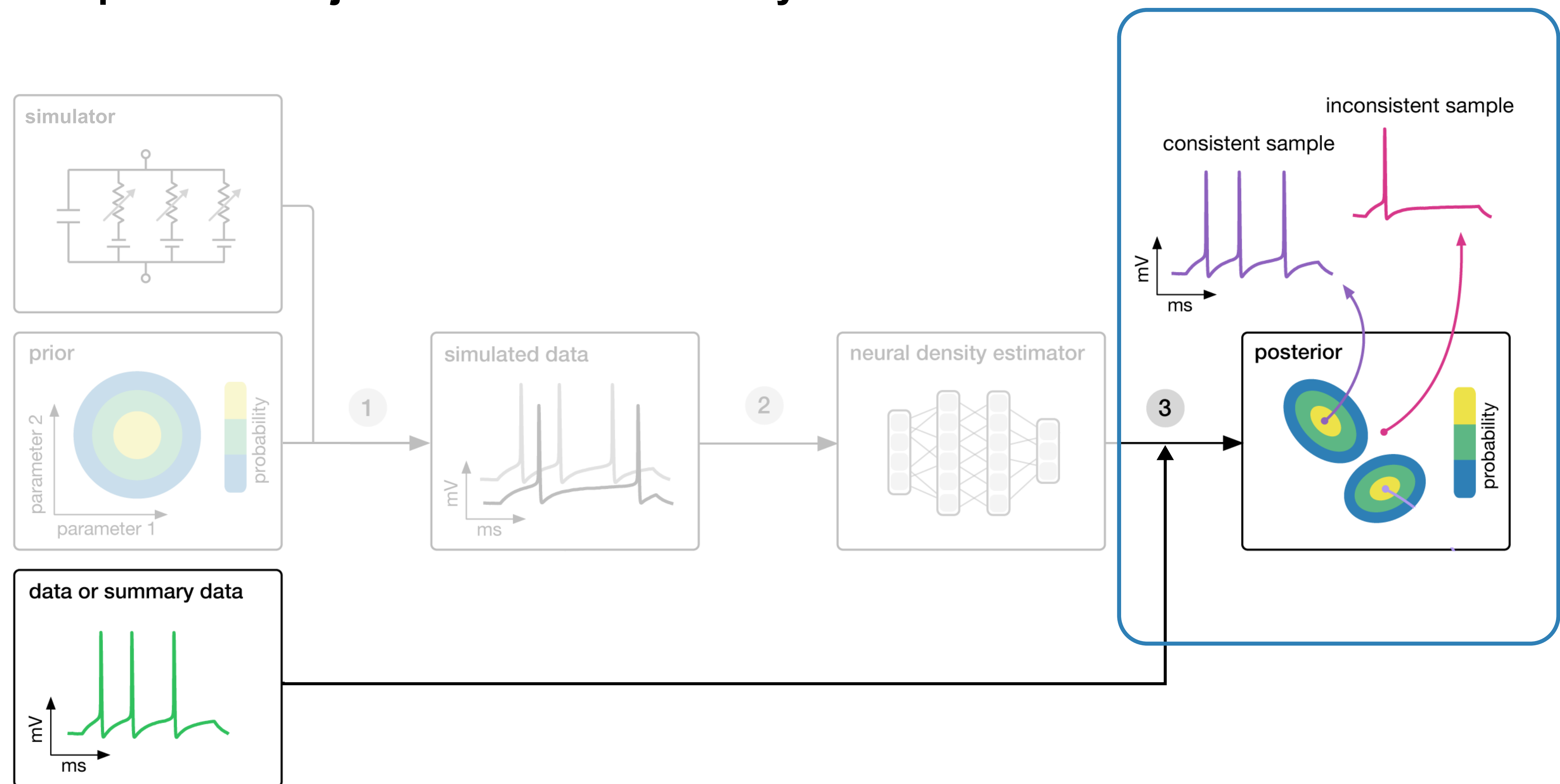
2. Pass the simulated data to the inference object



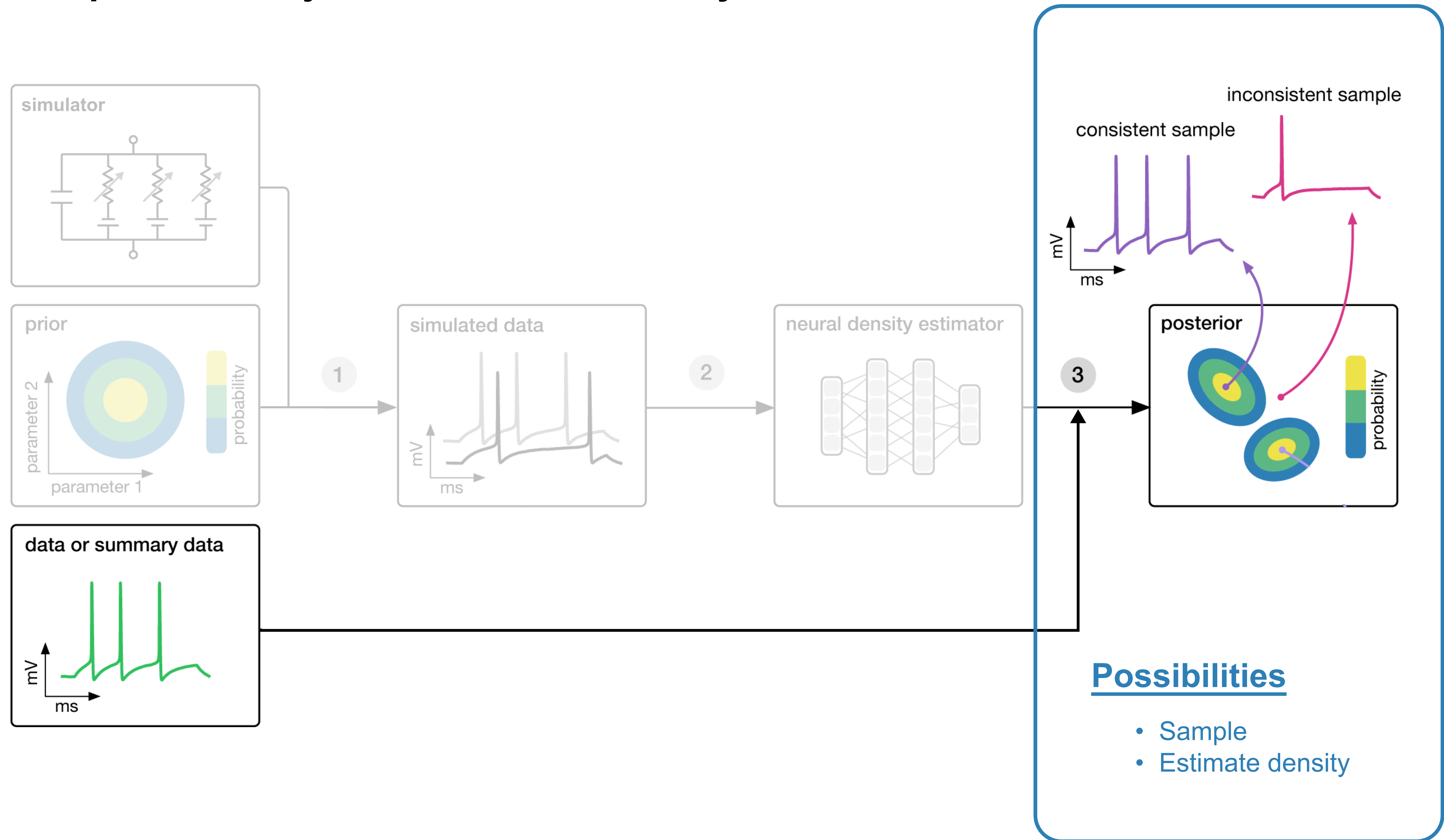
3. Build the posterior object from trained density



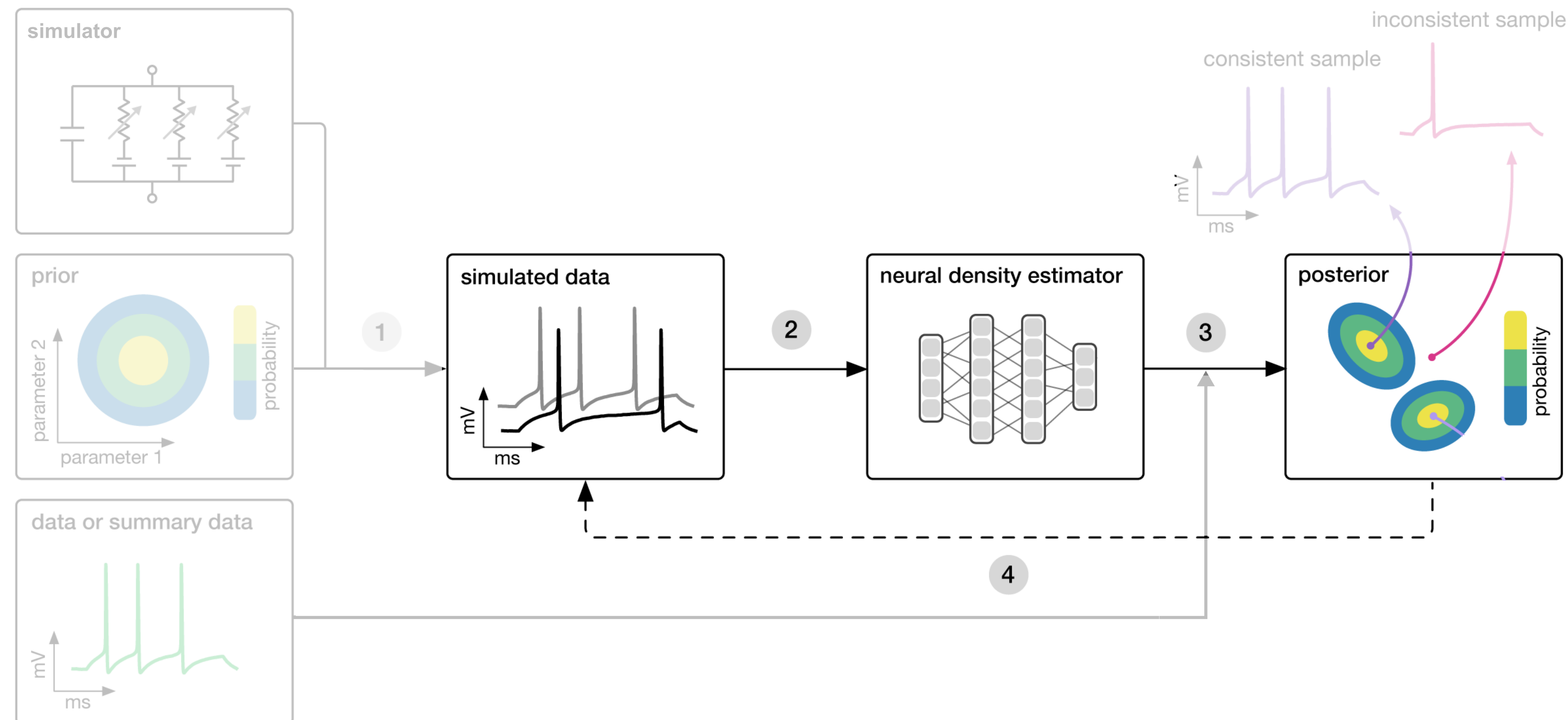
3. Build the posterior object from trained density

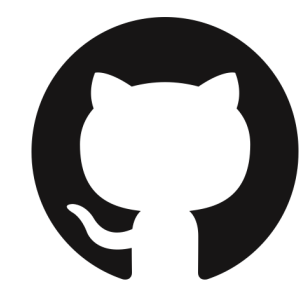


3. Build the posterior object from trained density



4. Multiround





<https://github.com/sbi-dev/sbi>

