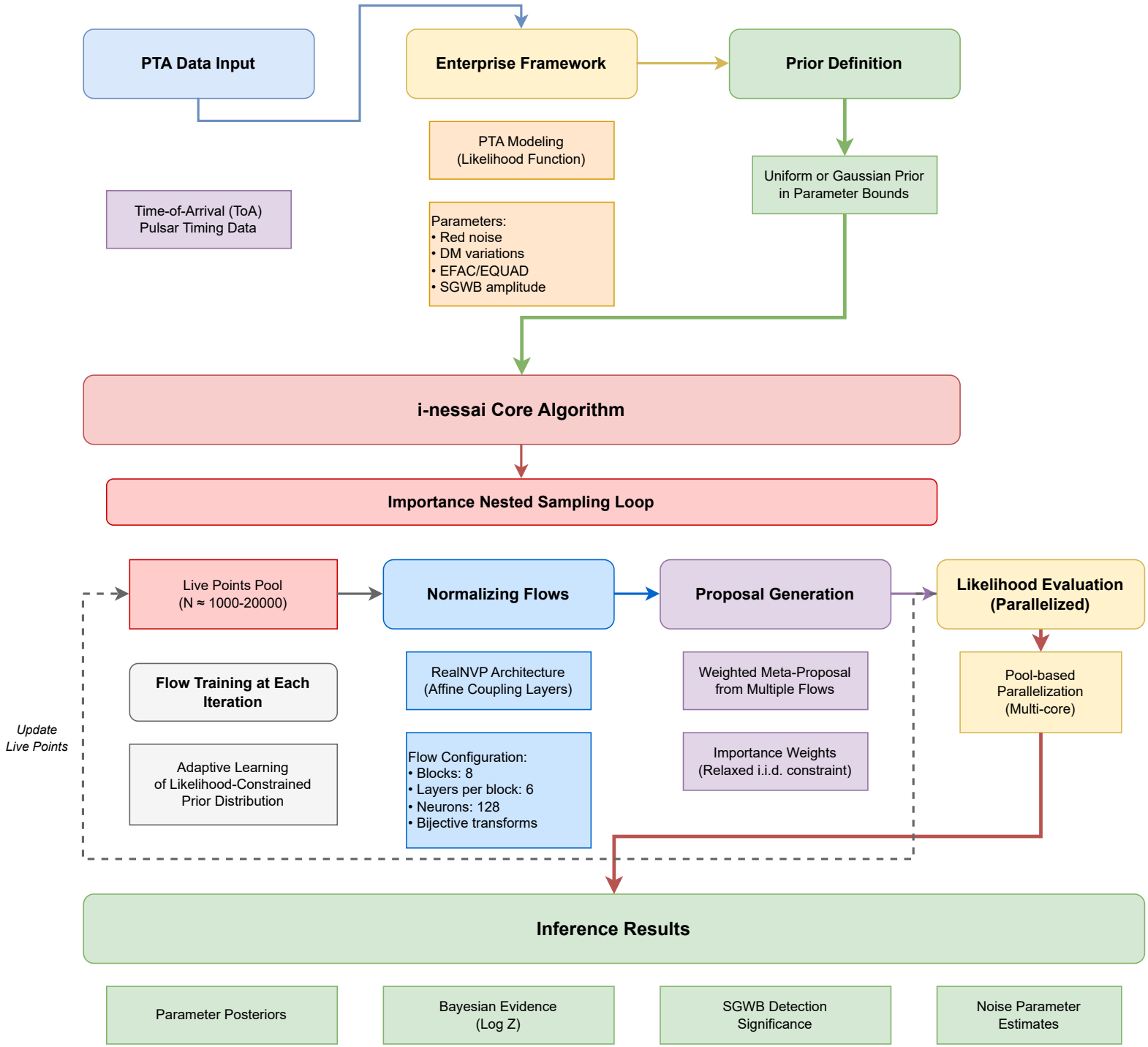
i-nessai: Importance Nested Sampling with Normalizing Flows for PTA Analysis



Performance Advantages

- 1-3 orders of magnitude speedup vs PTMCMC
- Single pulsar: 10-30h → minutes
- 10 pulsars: ~1 week → Few hours
- Efficient parallelization
- Unbiased parameter estimates

Key Features

- Importance-weighted sampling
- Batch evidence updates
- Flexible sample ordering
- Operates in unit hypercube
- Multiple trained flows combined

Legend

- Enterprise: PTA likelihood
- Normalizing Flows: RealNVP
- Nested Sampling Core
- Results & Inference