Supplementary File 1

A: Model Summary	
Populations	Multiple modules, each one composed of 1 excitatory and 1 inhibitory sub-population
Topology	None
Connectivity	Sparse, random recurrent connectivity with random or topographically structured feed-forward projections (fixed in-degrees)
Neuron Model	Leaky integrate-and-fire, fixed voltage threshold, fixed absolute refractory time, no adaptation
Synapse Model	Exponentially decaying postsynaptic currents, static synaptic weights, fixed delays
Plasticity	None
Input	Stochastic background spikes and inhomogeneous Poisson spikes onto $d_0 N^{\mathrm{E}}$ excitatory and $d_0 N^{\mathrm{E}}$ inhibitory neurons in SSN_0
Measurements	Spiking activity, membrane potentials

B: Populations		
Name	**Elements**	**Size**
E_i	`iaf_psc_exp`	8000
I_i	`iaf_psc_exp`	2000

C: Neuron Models	
Name	Leaky integrate-and-fire (LIF) neuron (`iaf_psc_exp`)
Subthreshold Dynamics	if $(t > t^* + \tau_{\mathrm{ref}})$ $\tau_{\mathrm{m}} \frac{dV_i(t)}{dt} = (V_{\mathrm{rest}} - V_i(t)) + R_{\mathrm{m}} \left(I_i^{\mathrm{E}}(t) + I_i^{\mathrm{I}}(t) + I_i^{\mathrm{X}}(t) \right)$ else $V(t) = V_{\mathrm{reset}}$
Spiking	If $V(t-) < V_{\mathrm{th}}$ OR $V(t+) \geq V_{\mathrm{th}}$ 1. set $t^* = t$ 2. emit spike with time stamp t^*

D: Synapse Models	
Synaptic Transmission	$\tau_\beta \frac{dI_i^\beta(t)}{dt} = -I_i(t) + \tau_\beta \hat{I}_\beta \sum_j \sum_k \delta(t - t_j^k)$ with postsynaptic potential $\mathrm{PSP}_{ij}(t) = \hat{I}_\beta \frac{R_{\mathrm{m}} \tau_\beta}{\tau_\beta - \tau_{\mathrm{m}}} \left(e^{-t/\tau_\beta} - e^{-t/\tau_{\mathrm{m}}} \right) \Theta(t)$ and Heaviside function $\Theta(t) = \begin{cases} 1 & t \geq 0 \\ 0 & \text{else} \end{cases}$. The synaptic efficacy (weight) corresponds to the PSP amplitude: $J_\beta = \hat{I}_\beta R_{\mathrm{m}} \frac{\tau_\beta}{\tau_\beta - \tau_{\mathrm{m}}} \left(\left[\frac{\tau_{\mathrm{m}}}{\tau_\beta} \right]^{\frac{-\tau_m}{\tau_m - \tau_\beta}} - \left[\frac{\tau_{\mathrm{m}}}{\tau_\beta} \right]^{\frac{-\tau_\beta}{\tau_{\mathrm{m}} - \tau_\beta}} \right)$

E: Input		
Type	**Target**	**Description**
poisson_generator	E_0, I_0	Total rate $\nu_{\mathrm{X}} \cdot \mathrm{K}_{\mathrm{X}}$
poisson_generator	E_i, I_i for $i > 0$	Total rate $0.25 \cdot \nu_{\mathrm{X}} \cdot \mathrm{K}_{\mathrm{X}}$
inhomogeneous_poisson_generator	$\mathrm{E}_0^{(k)}$, $\mathrm{I}_0^{(k)}$ for $S_k \in S$ $\mathrm{E}_0^{'(j)}$, $\mathrm{I}_0^{'(j)}$ for $S'_j \in S'$	Inhomogeneous Poisson process with rate ν_{stim}, changing every 200 ms

F: Measurements
Spiking activity, membrane potentials

Table 1: Tabular description of current-based (baseline) network model after [94].