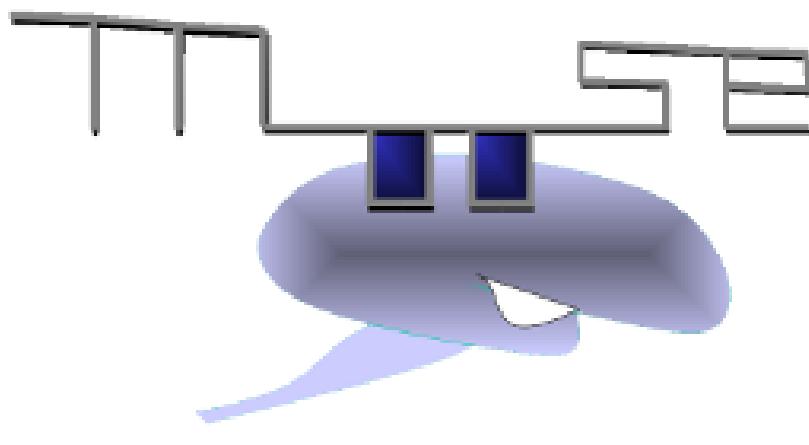


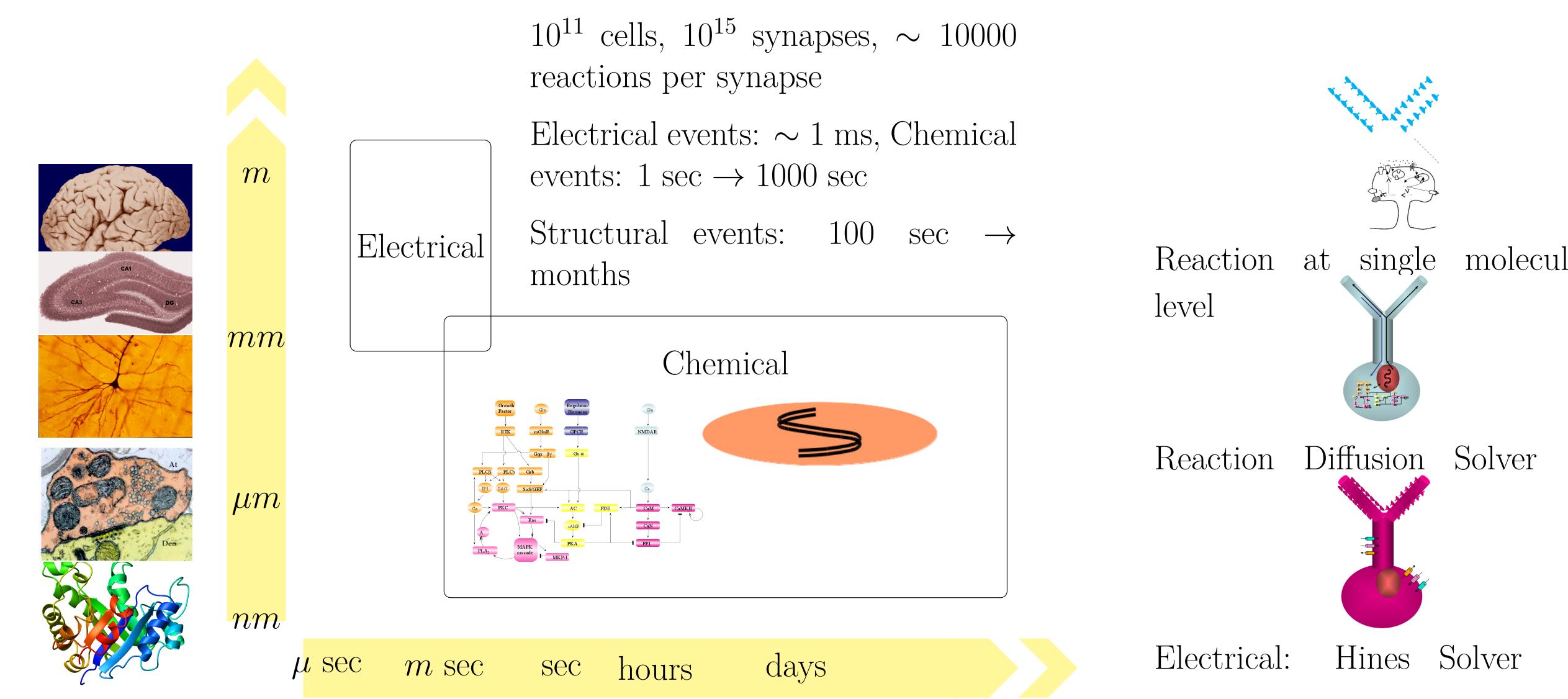
# Modelling Memory Across Scales

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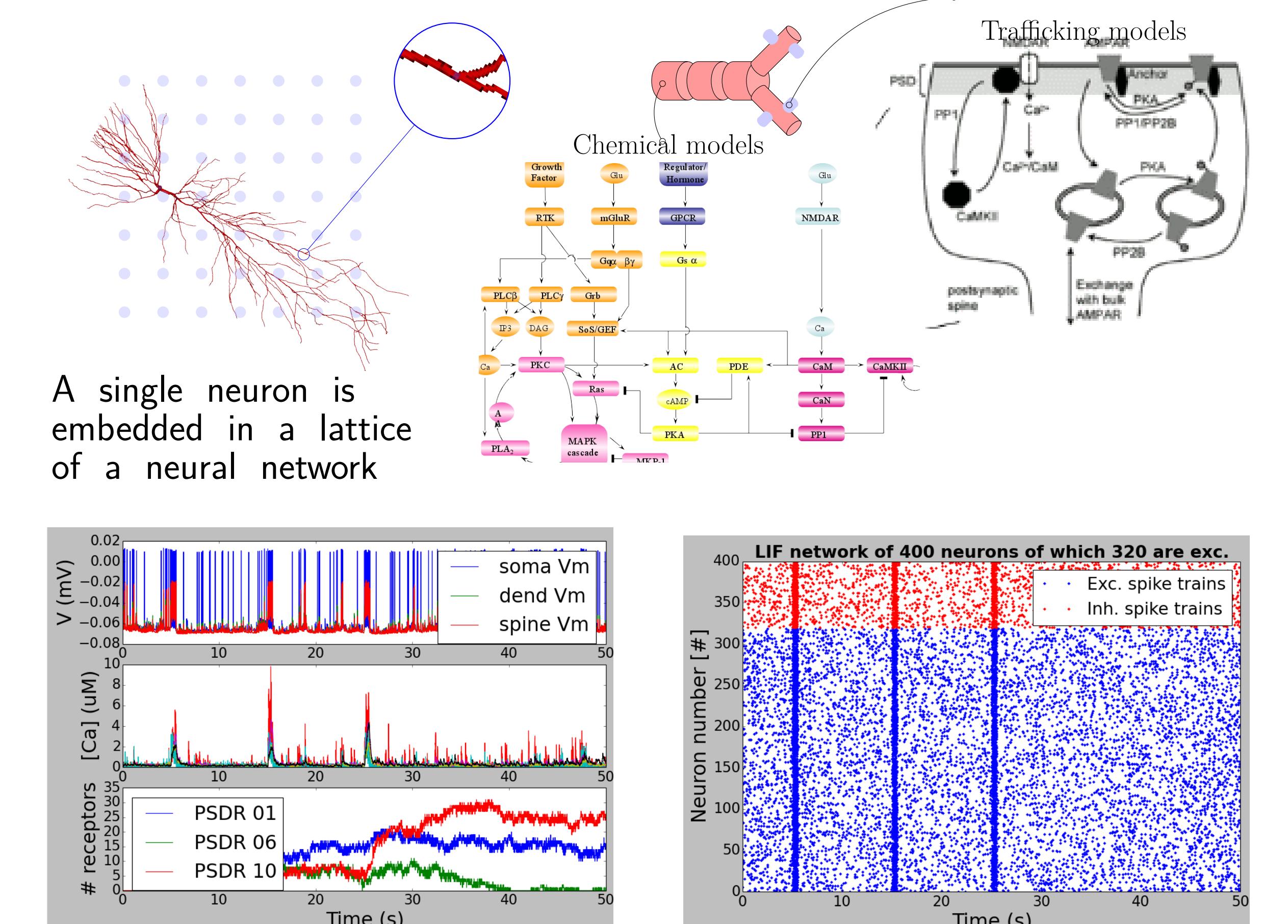
## 1. Why Multiscale?

- Memory and plasticity involve brain mechanisms from molecular scale to enormous networks.
- We have developed MOOSE the Multiscale Object Oriented Simulation Environment, to model plasticity and brain computation across scales.

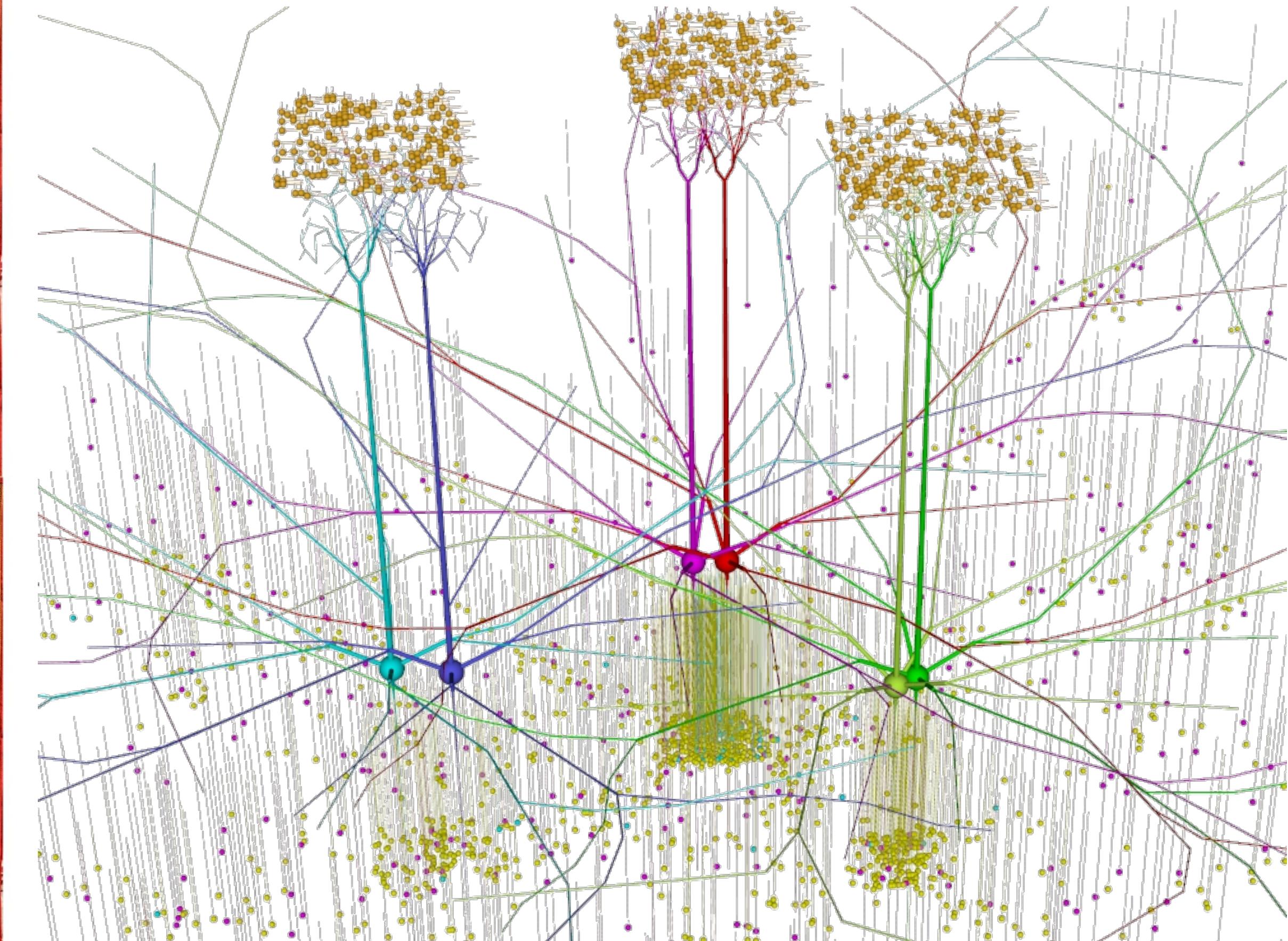


## 2. Some projects using MOOSE

### 2.1 MODELLING MEMORY

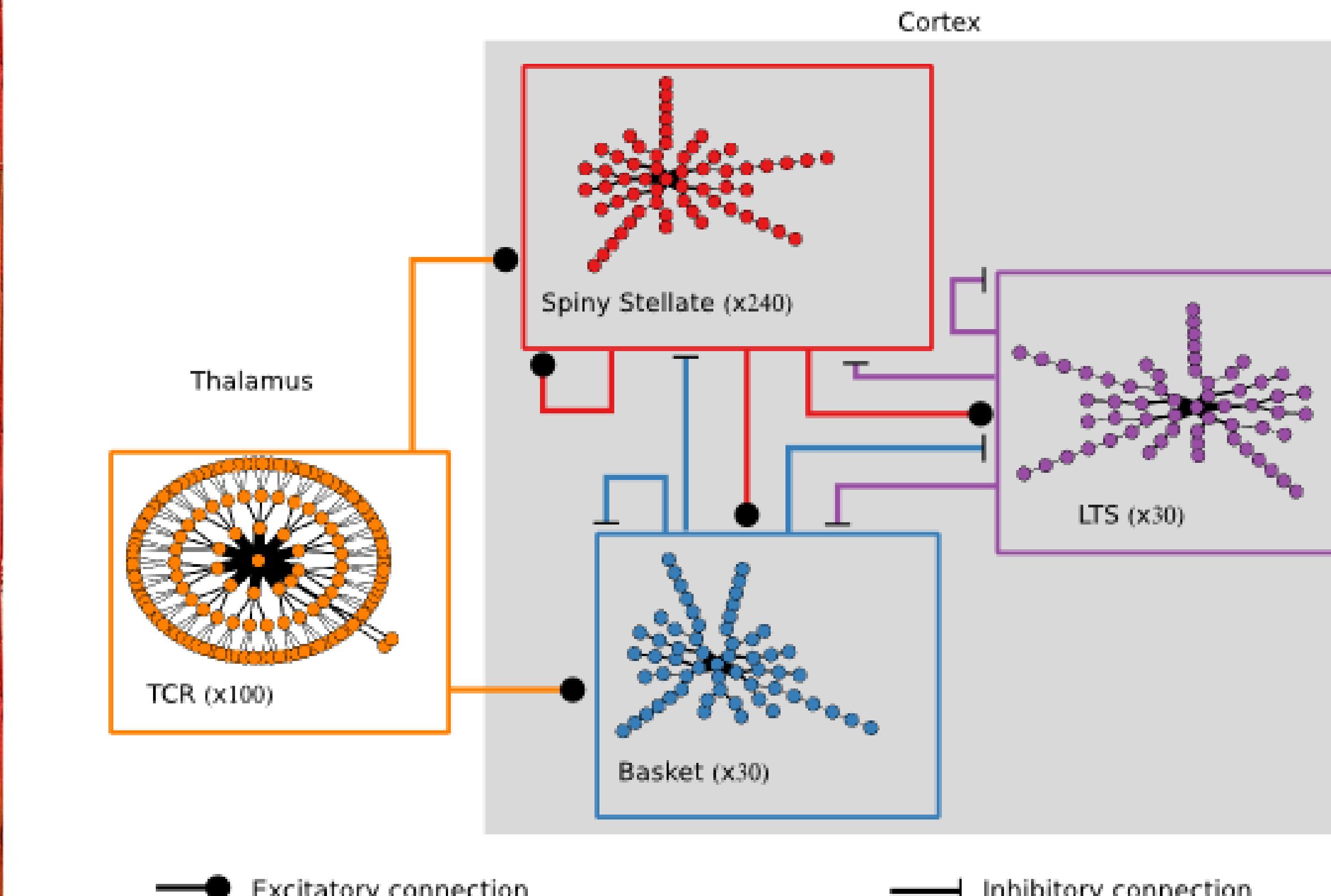


### 2.2 MODELLING OLFACTORY BULB

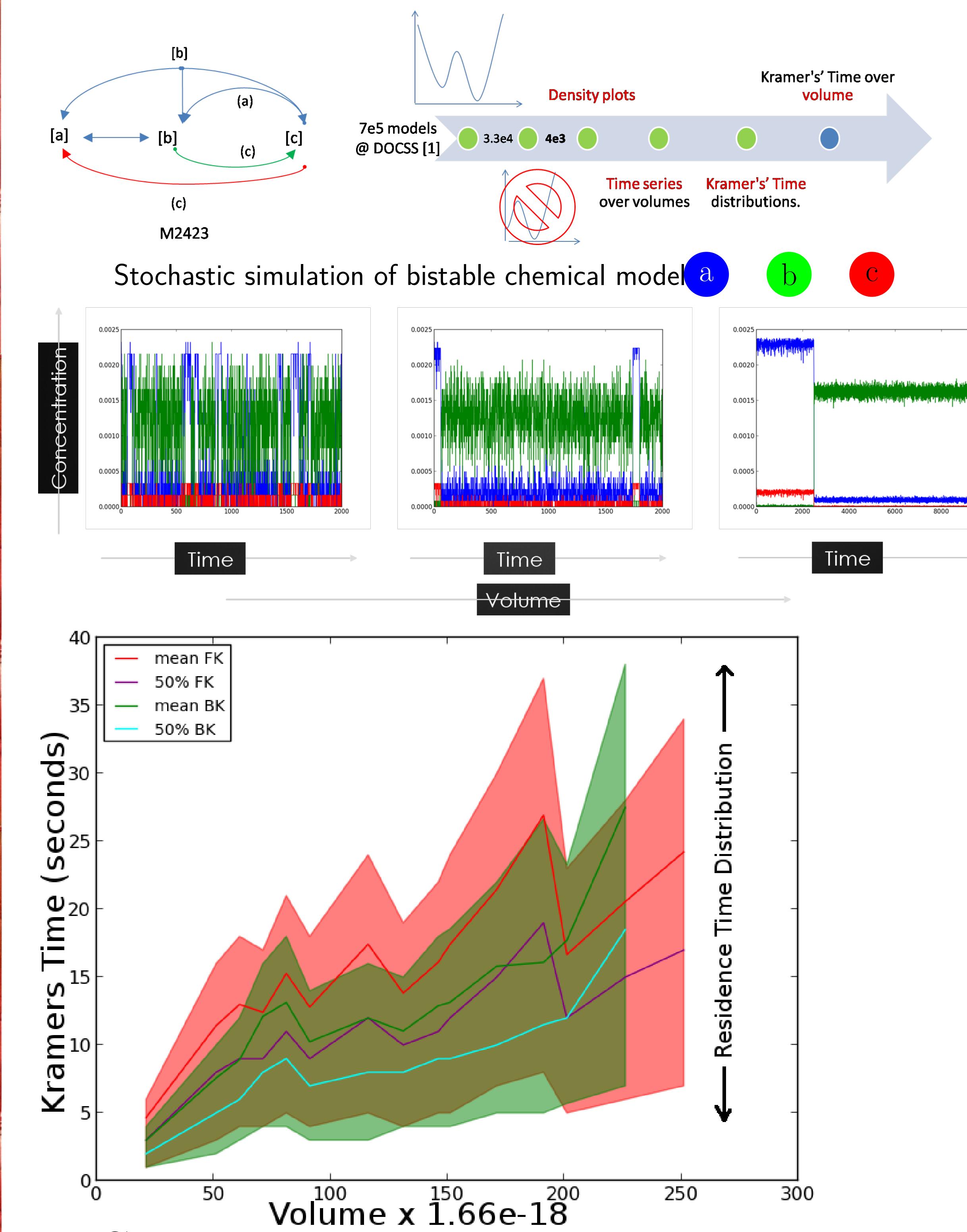


Network coding and computation in olfaction and somatosensory cortex. It explains linear coding and phase-decorrelation and predicts connectivity, lateral dendrite output structure.

### 2.3 MODELLING CORTEX



### 2.4 ROBUSTNESS OF CHEMICAL SWITCHES



## 4. Summary

We use models to,

- Integrate many scales of neuronal data with basic physical/chemical principles.
- Explain phenomena of plasticity, activity and neuronal coding.
- Predict circuit mechanisms, plasticity rules, and emergent phenomena such as *decorrelation*, *robustness*, and *memory decay*.