Motivation for Traub and Miles - *Neuronal Networks of the Hippocampus*

- How can activity of so many cells be measured and understood when experimental techniques only allow access to a few?
- We aim to simulate a neuronal population from estimates of cellular currents, synaptic properties and anatomical connections. In essence, build from the ground up
- We will focus on CA3 region of hippocampus
  - Anatomical simplicity – easy to get experimental data from slices
  - Otherwise difficult to find regions with straightforward functions and determinable cellular properties, synaptic interactions and collective behavior
  - We won't, however, uncover hippocampal computation, i.e - why it is important for long term memory. Instead we aim to answer questions pertaining to small networks and systems of neurons.
  - Experimental preparations contain $10^3 - -2 \times 10^4$ cells, entire hippocampus contains $10^6$ cells, human brain is $10^{11}$ cells.
- We study various levels of organization:
  1. Single membrane currents, isolated neurons
  2. Firing properties of individual neurons within brain slices
  3. Synaptic interactions within slides of brain
  4. Response of populations to spontaneous activity or local stimuli
- Keep in mind the date of this work – Book published in 1991.