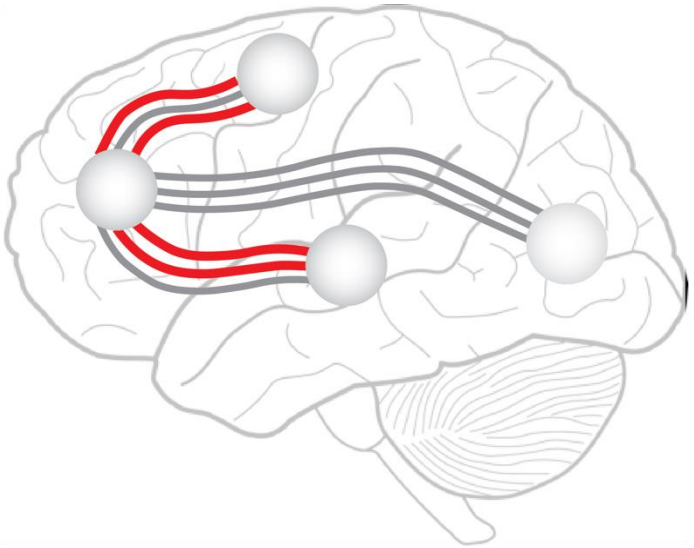
ALLEN INSTITUTE *for*
NEURAL DYNAMICS

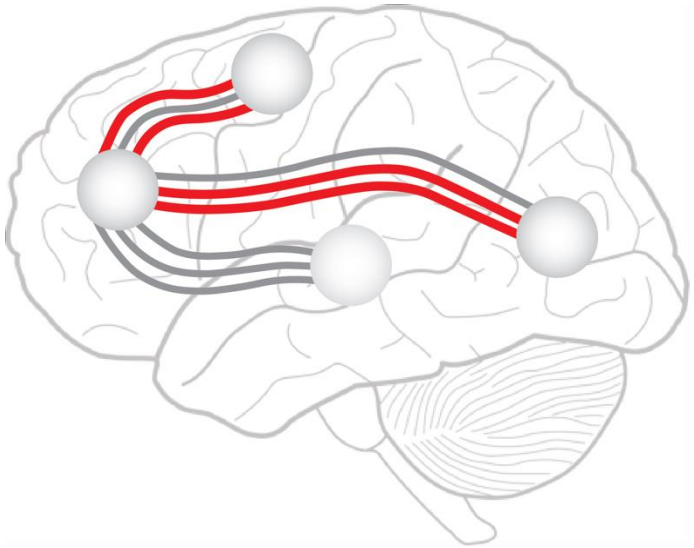
DYNAMIC ROUTING PROJECT

FROM SEPT 2024 SCIENTIFIC ADVISORY COUNCIL MEETING

Listening (auditory)

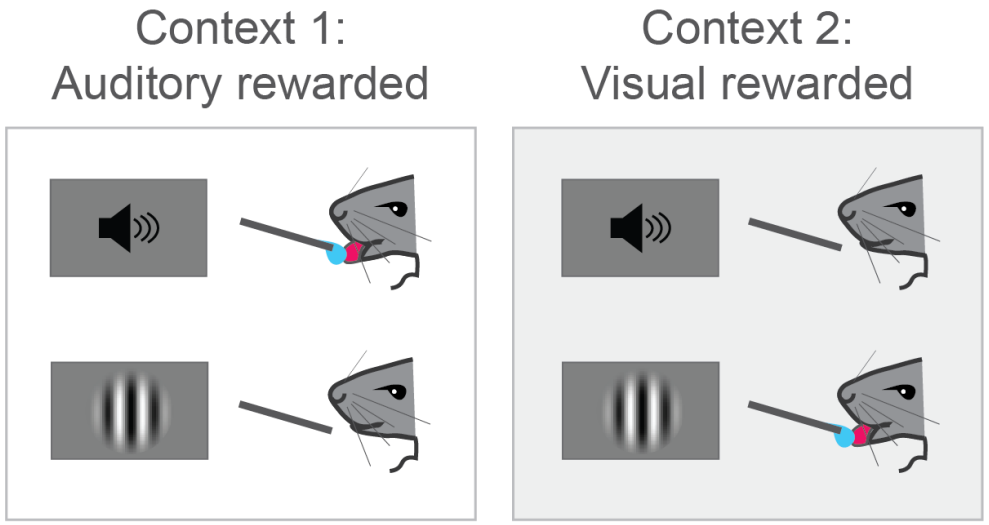


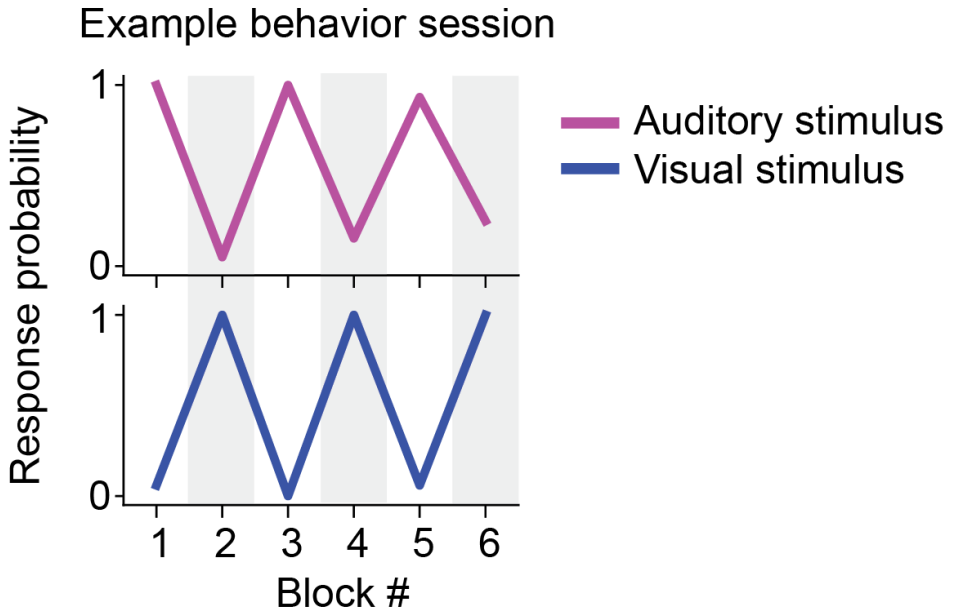
Reading (visual)



- How does the brain mediate flexible behavior?
- How is information dynamically routed between brain regions?

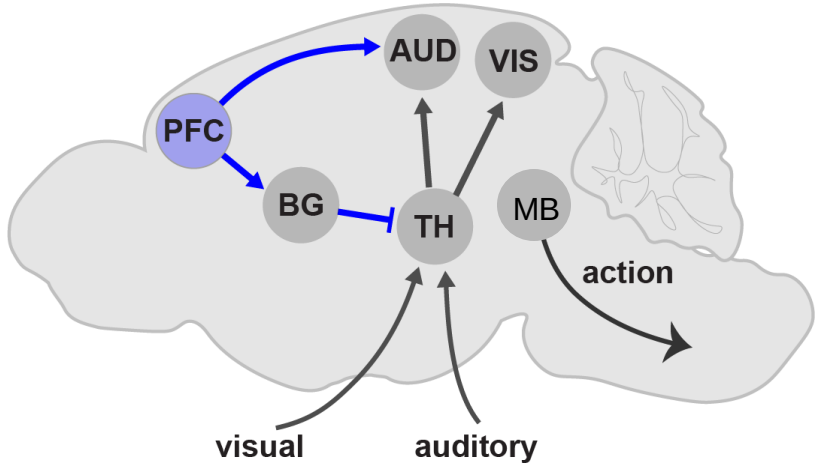
Task switching



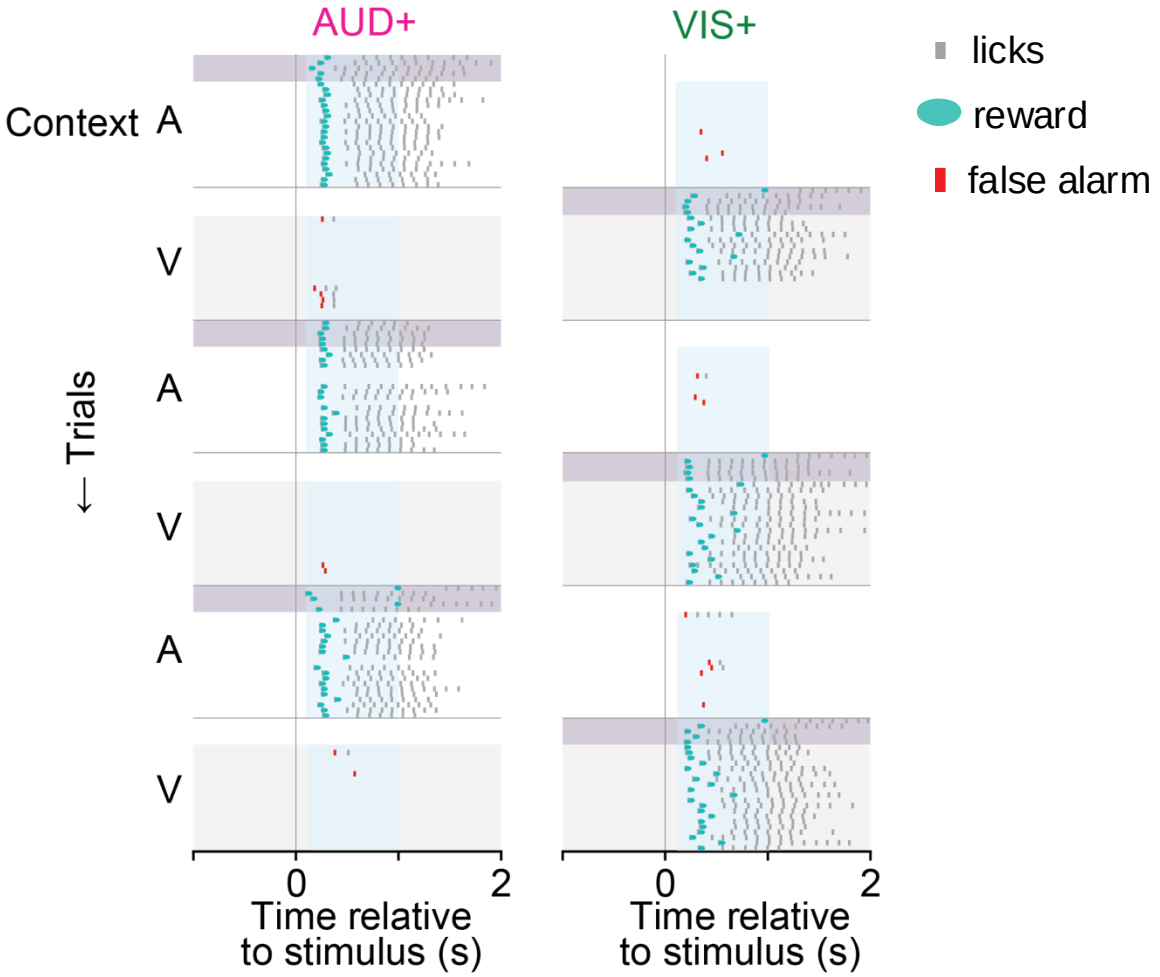


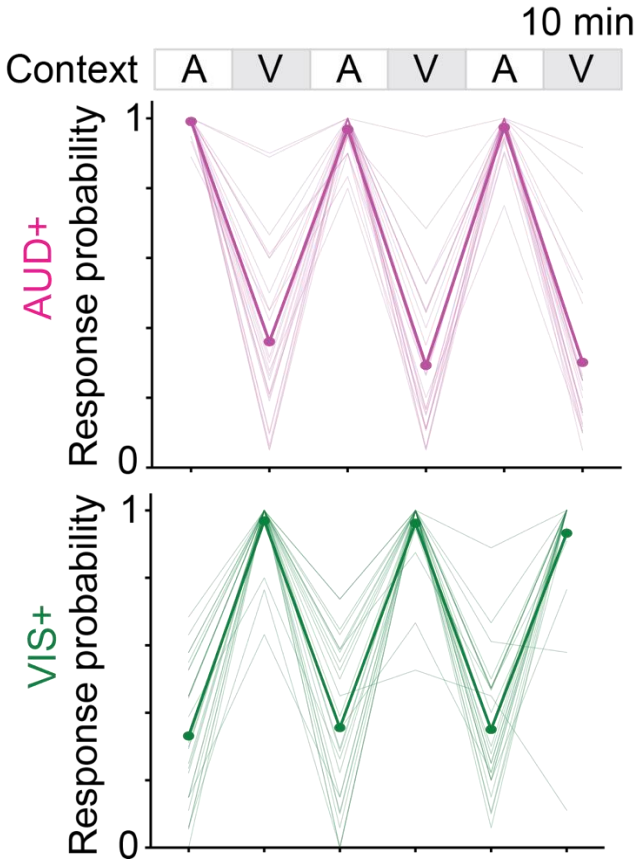
Scientific goals

- Brain-wide survey of activity underlying sensory task switching
  - Identify candidate routing circuits
- Test candidate routing circuits
  - Area-, cell type-, and projection-specific perturbations
  - Model and theory guided targeted experiments



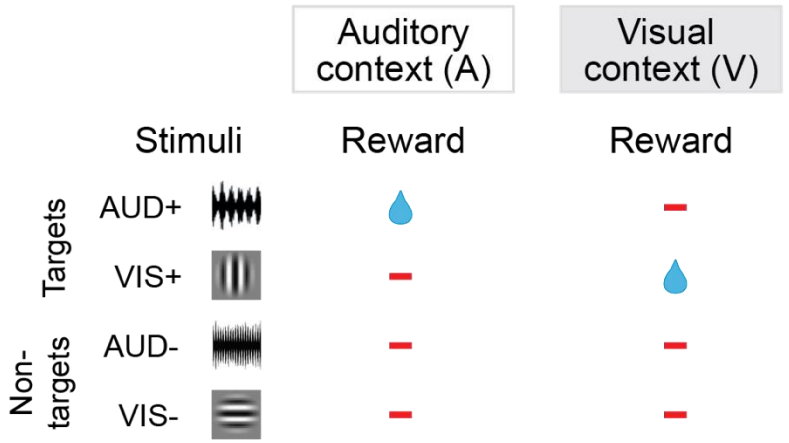
Mice switch between auditory and visual tasks

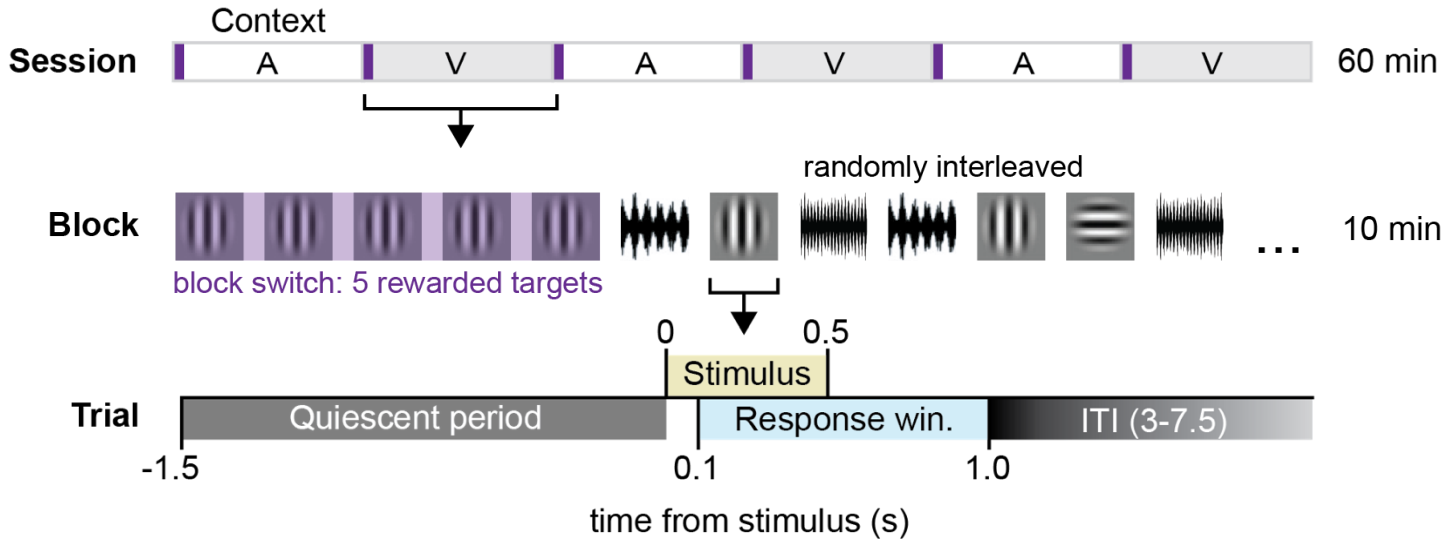




N = 17 mice,
26 sessions

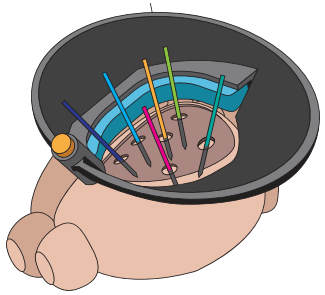
Dynamic Routing task description



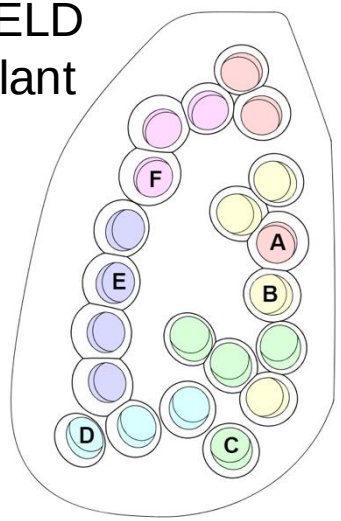


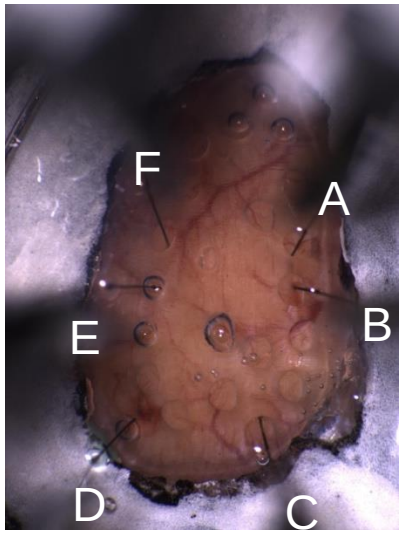
Multi-regional Neuropixels recordings

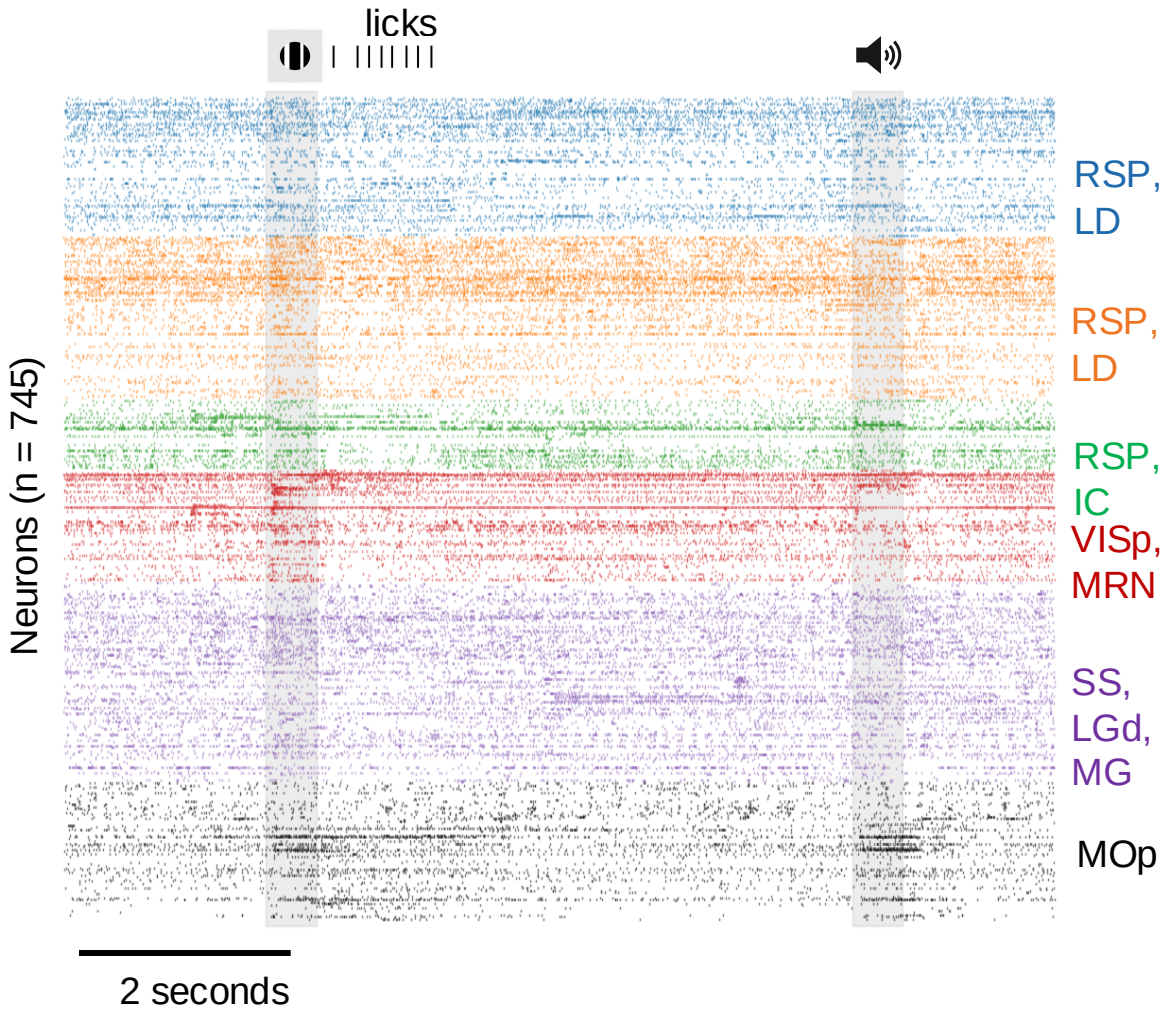
Multi-probe recordings



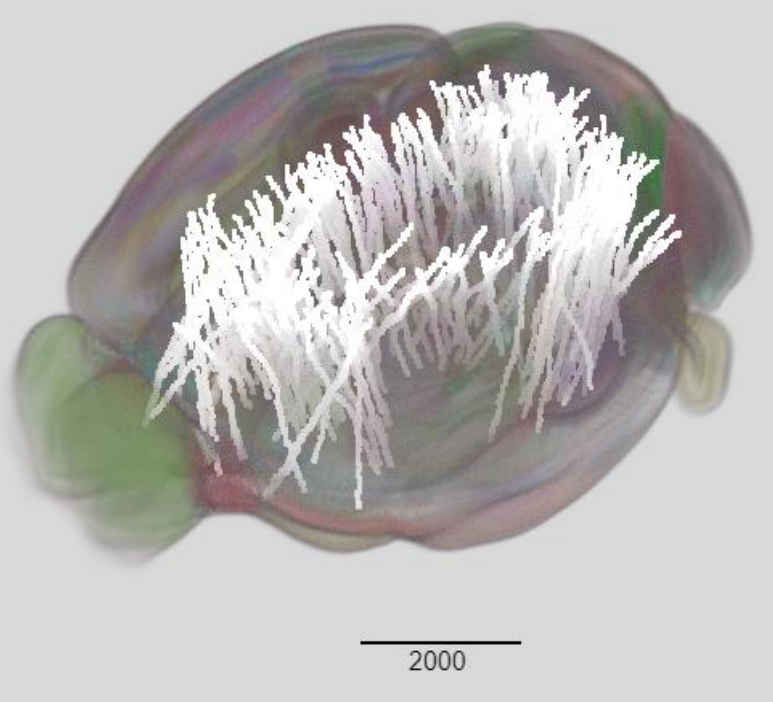
SHIELD implant







Current dataset

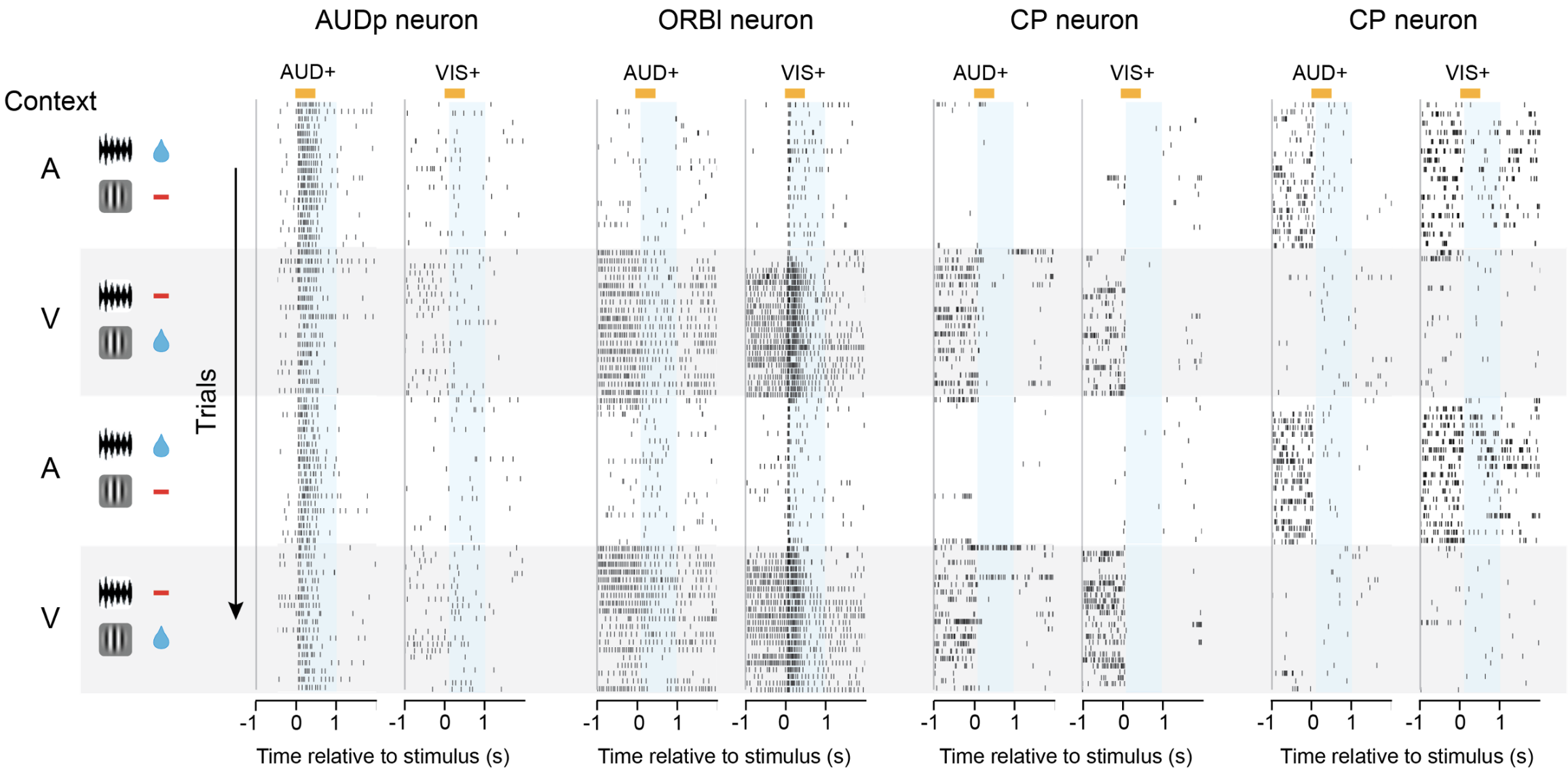


80 sessions, 31 mice

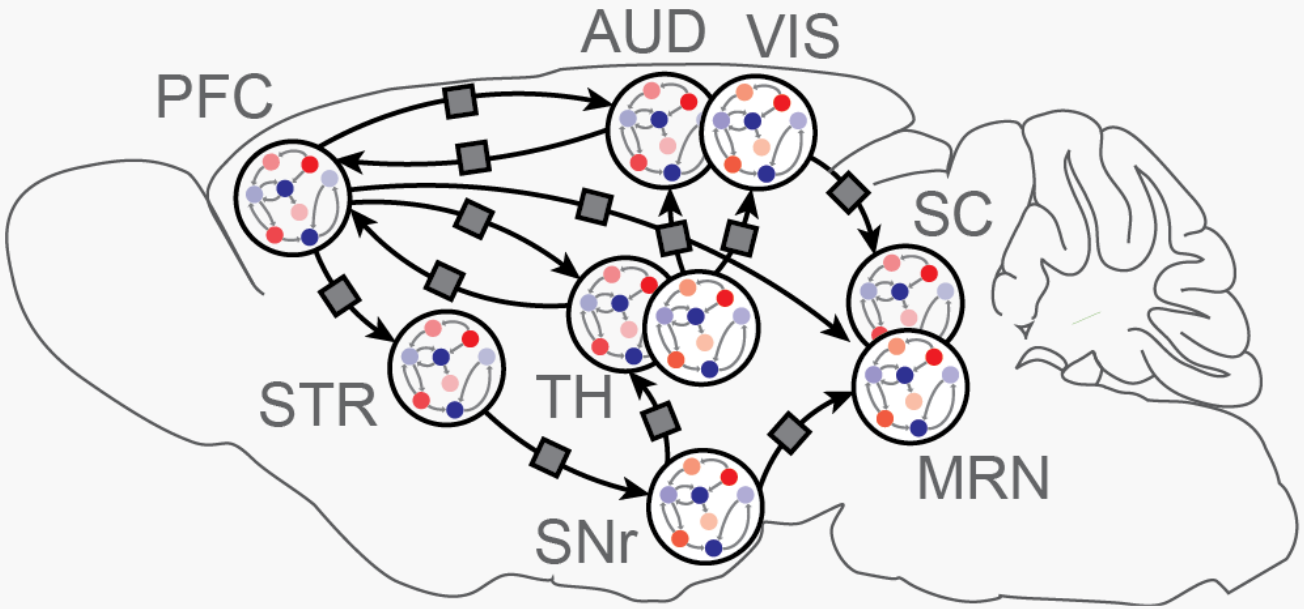
66 areas (at least 3 recordings with at least 20 units)

~60,000 units

Anticipated completion early 2025


AUDp neuron
ORBl neuron
CP neuron
CP neuron
AUD+
VIS+
Context
A
V
A
V
Trials
-1
0
1
Time relative to stimulus (s)

Multi-regional RNN



w/ Ulises, Stefan, et al. See Theory presentation