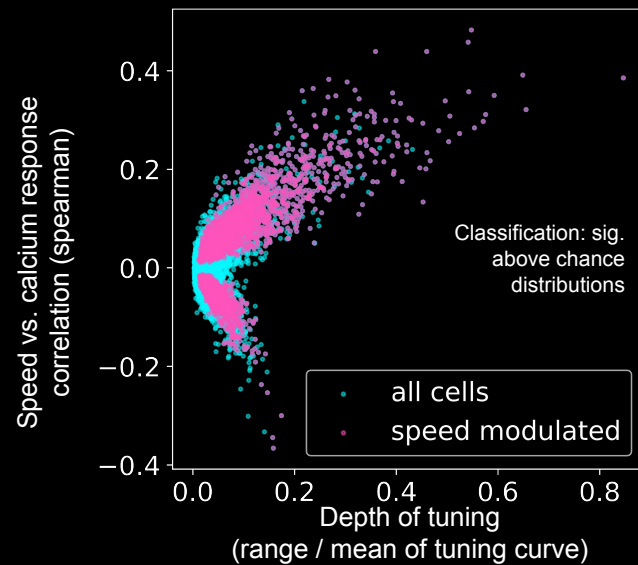# Spatiotemporal Distribution of Motor Processing in V1
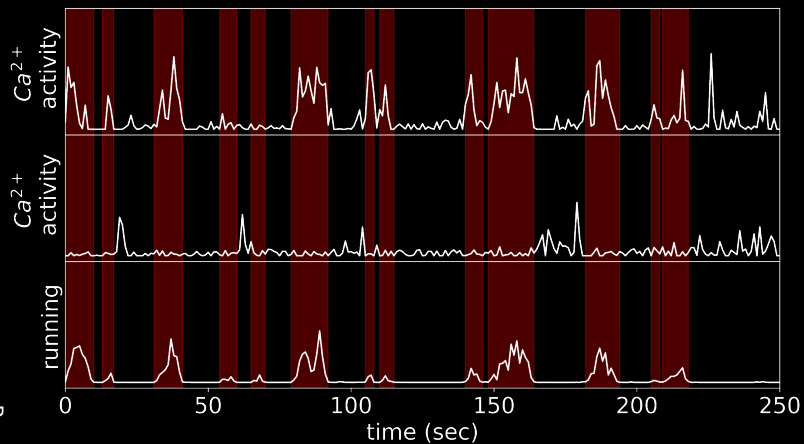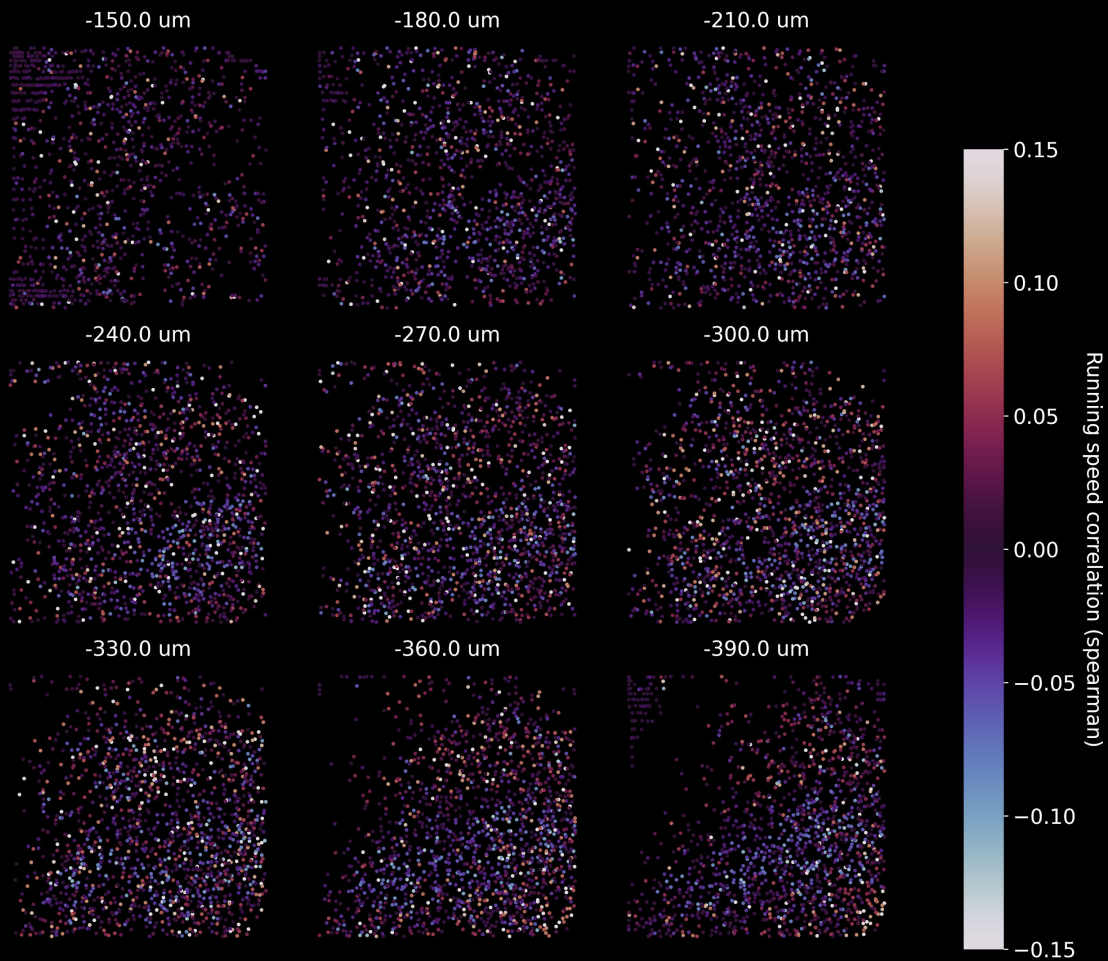
A sparse population of the (all) knowing grebes (pod-168)
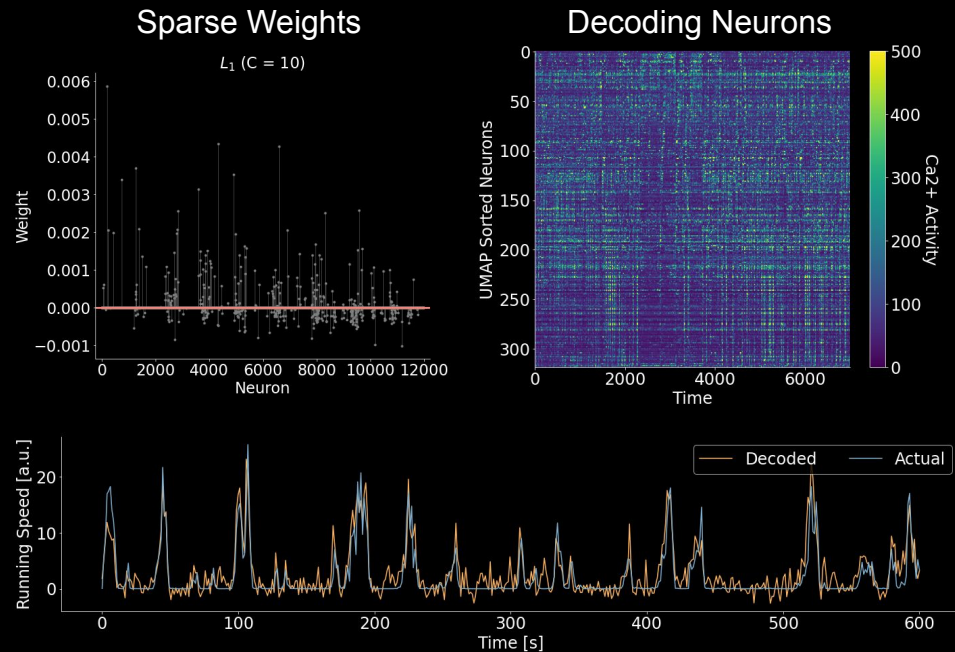Dancing in the Dark

Questions

(1) Is running speed represented in V1 in the absence of visual and vestibular inputs?

    (a) Are V1 Neurons correlated with running speed

    (b) Can V1 Neurons decode running speed

    (c) How are the decoding neurons distributed spatially in V1

    (d) How does the temporal profile of Ca^{2+} activity relate to running onset

(2) Does visual input interfere with V1's representation of running speed?
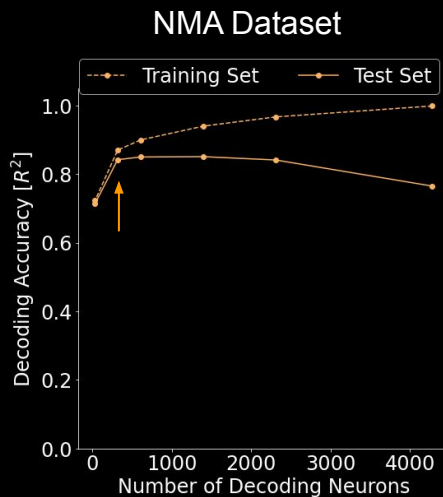
Z-stack of neurons color-coded by speed vs. calcium response correlation

-150.0 um   -180.0 um   -210.0 um

-240.0 um   -270.0 um   -300.0 um

-330.0 um   -360.0 um   -390.0 um

Running speed correlation (spearman)

Ca^{2+} activity

Ca^{2+} activity

running

time (sec)

Speed vs. calcium response correlation (spearman)

Depth of tuning
(range / mean of tuning curve)
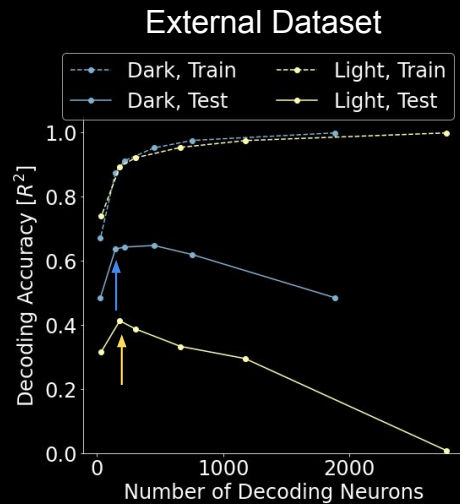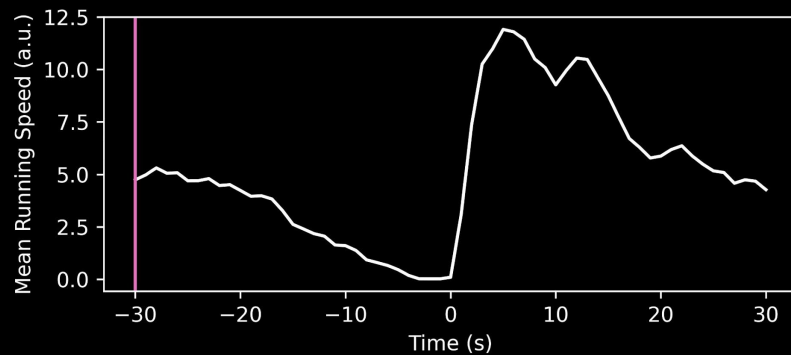
Classification: sig. above chance distributions

- all cells
- speed modulated

Decoding running speed: GLM + L1 norm

Sparse Weights

$L_1 (C = 10)$

Decoding Neurons

Decoding accuracy of V1

NMA Dataset

Dark vs Light

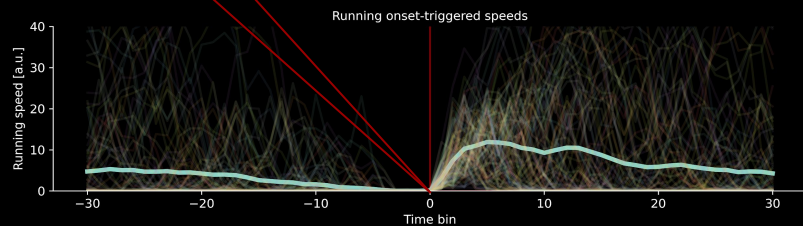## External Dataset

Running onset-triggered calcium activity in positively and negatively tuned neurons
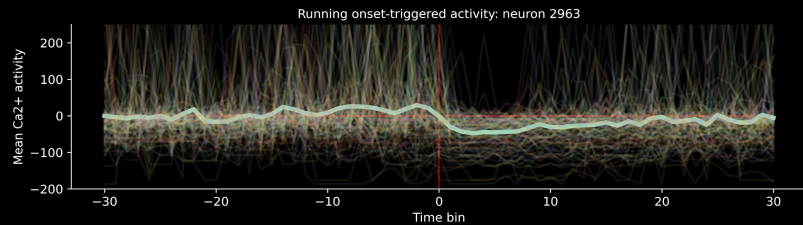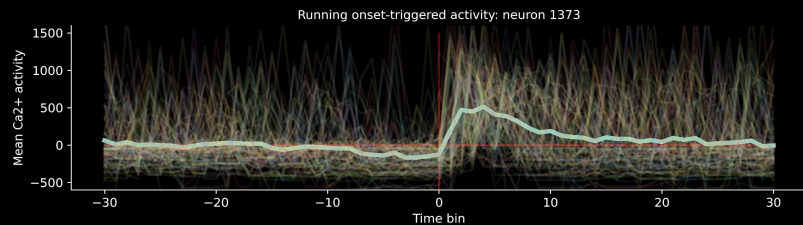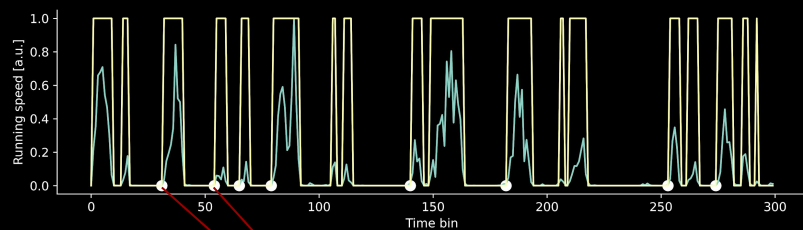
Spatiotemporal dynamics
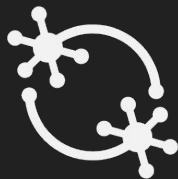https://youtu.be/4aWvZXFcbg8
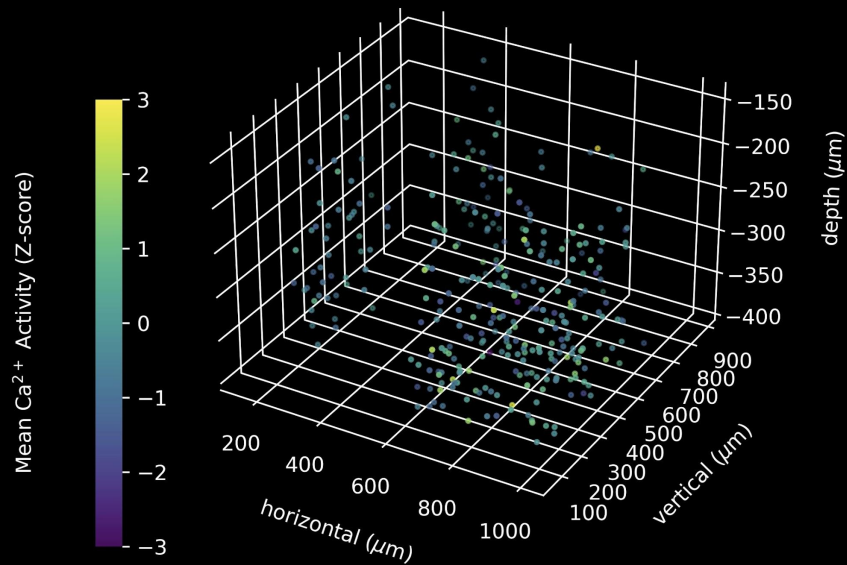
THANK YOU

NMA Organizers

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