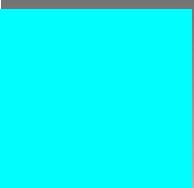
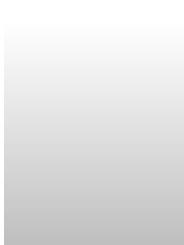
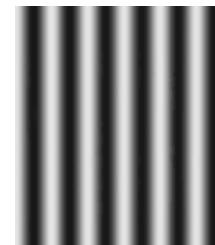
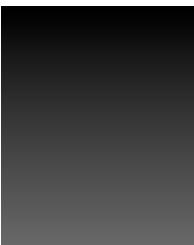
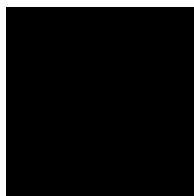
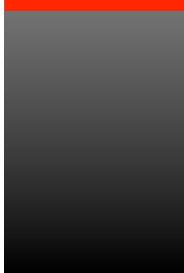
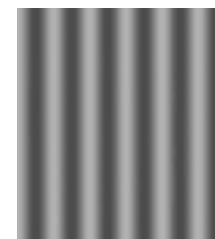
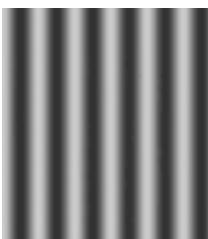
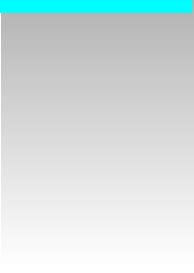
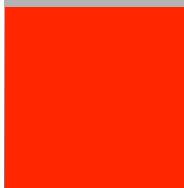


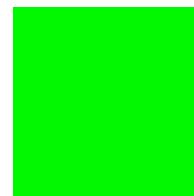
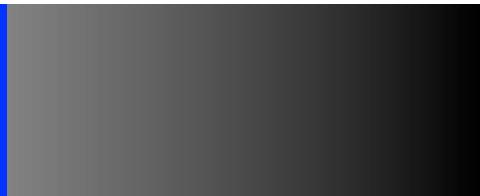
Smallest font



# Calibration slide



Smallest font



# Understanding the dataset



- Pascal Wallisch -

# Load the dataset into your workspace

- It's big.
- Loading it will take time.

# This is a very hands-on course...

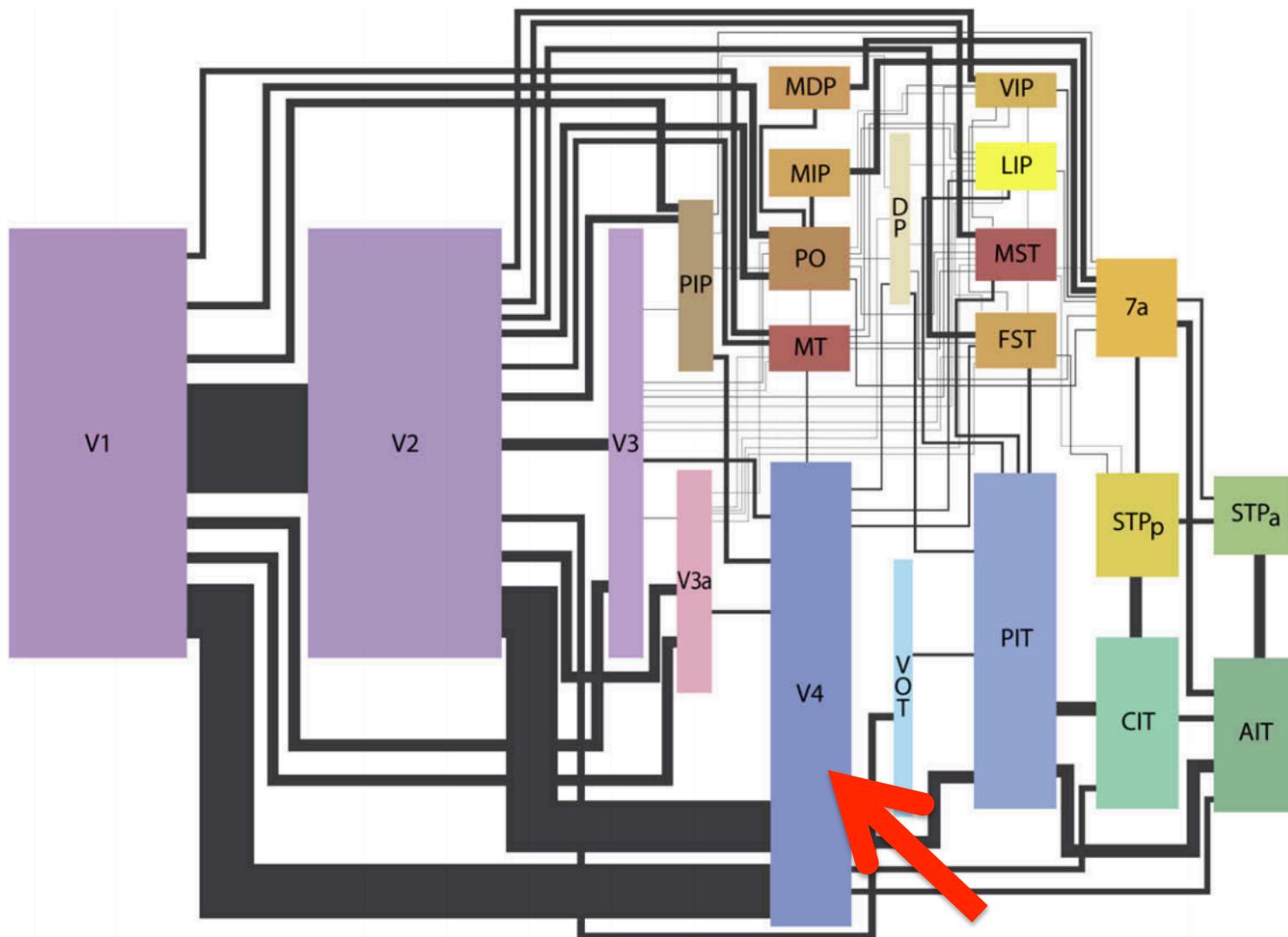
- We are not kidding about putting data front and center.
- It is of critical importance to use real data.
- It is also important to use as few datasets as possible in order to reduce switching costs.

# The first dataset

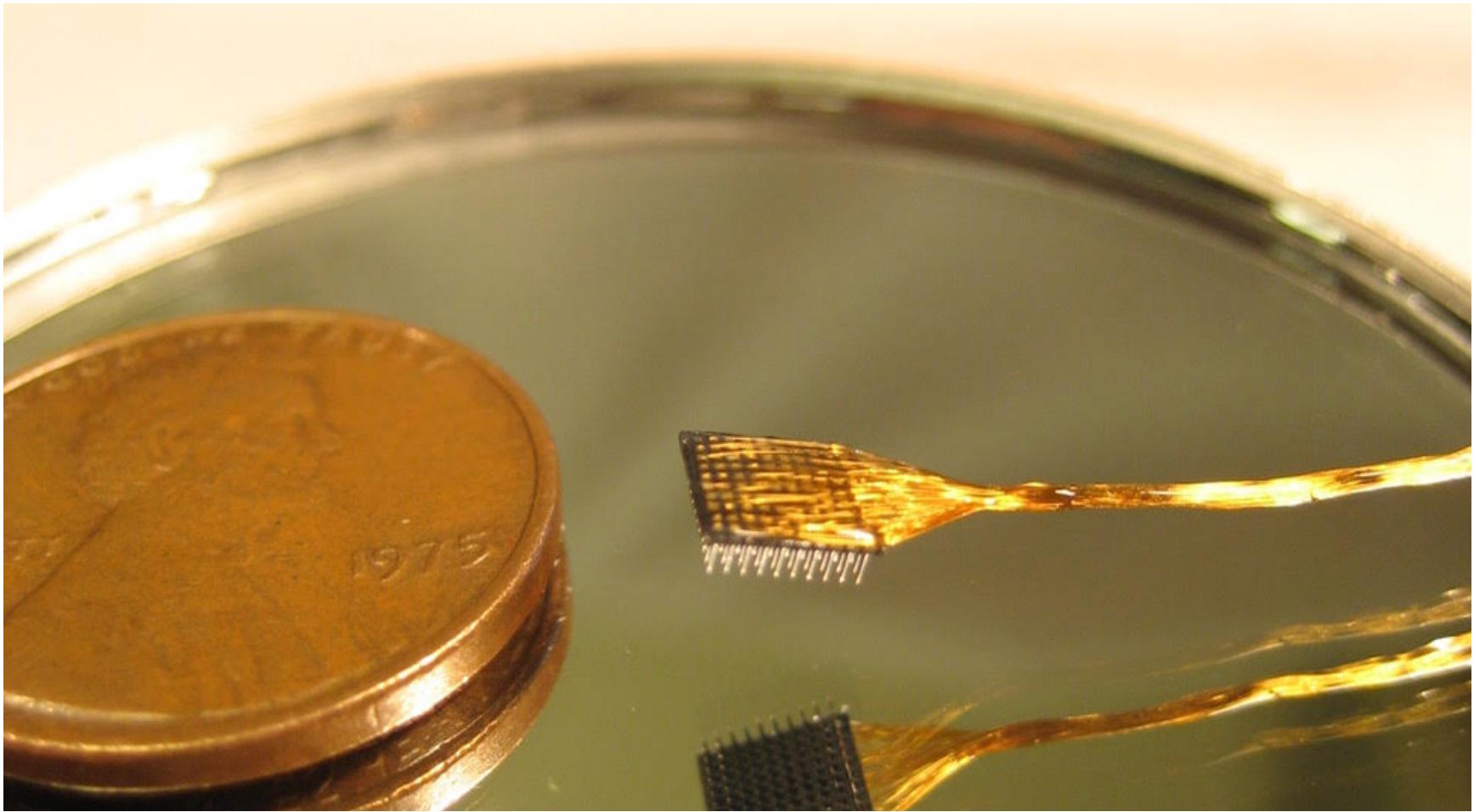
**Matt Smith**  
recorded a  
dataset  
specifically for use  
in this course,  
with certain  
properties.



# The recording site



# The recording device

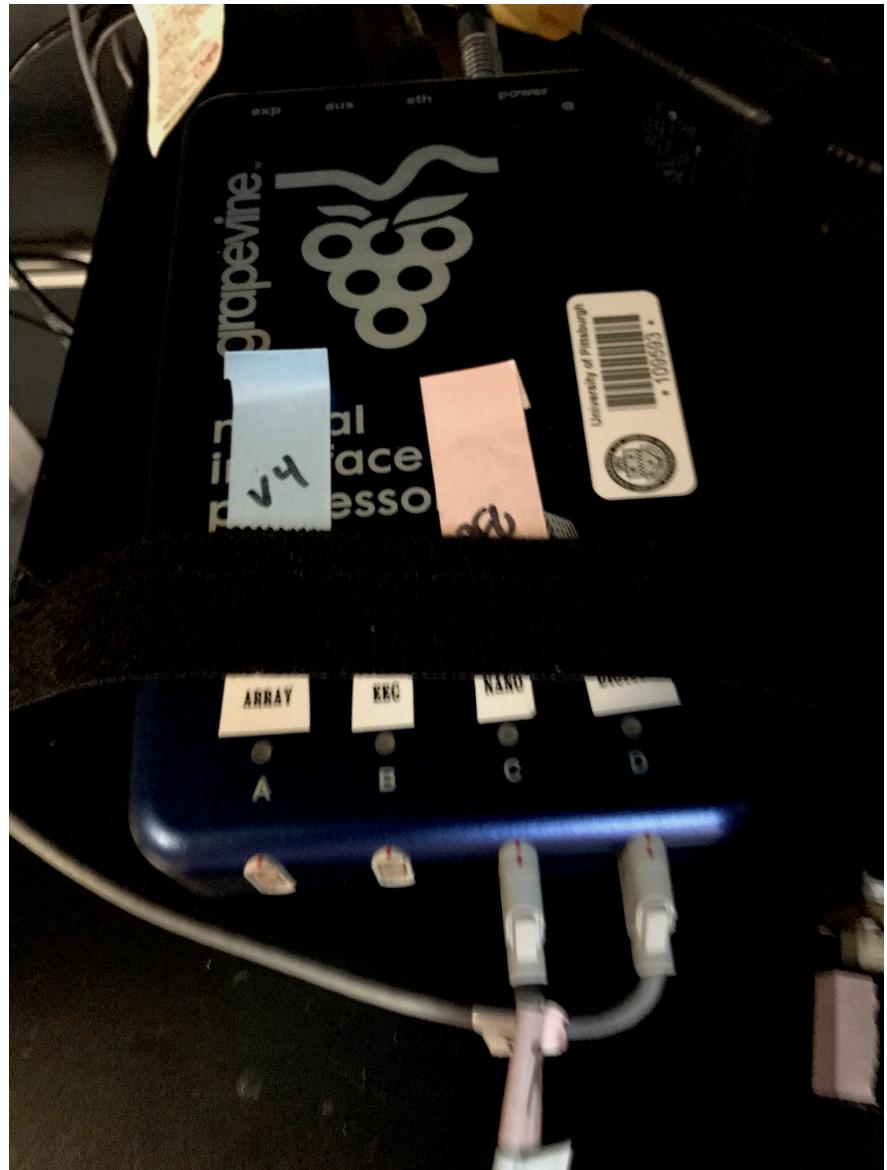


# The recording setup



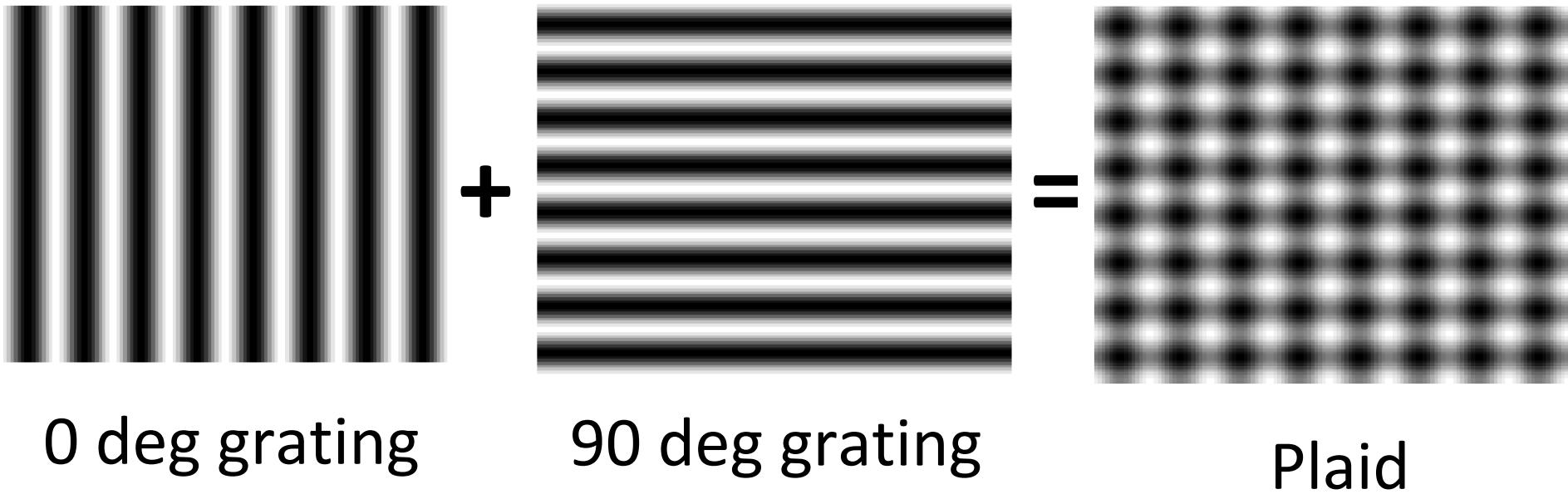
# The hardware (preamp)

- Ripple Grapevine
- Sampling 96 channels at 30 kHz



# The stimulus material

- Two superimposed half-contrast sinusoidal gratings (yielding full-contrast “plaids”)



- Presented parafoveally within a circular aperture with a diameter of 180 pixels at a spatial frequency of 1 cycle/degree.

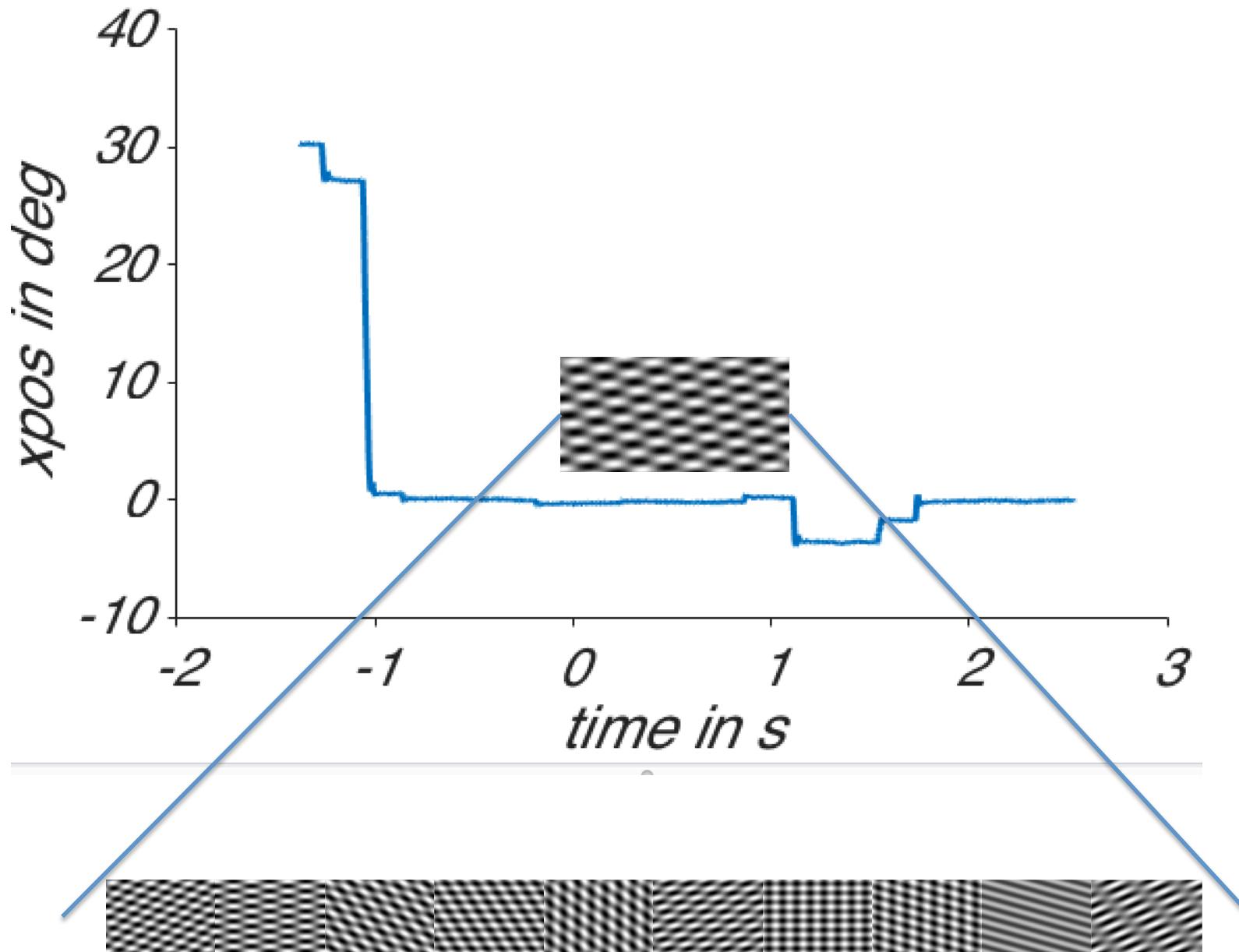
# The experimental paradigm

- Grating orientations were spaced 22.5 degrees apart
- This yields 8 orientations per grating
- Plus a blank, this yields  $9 \times 9 = 81$  unique stimuli
- Each stimulus was presented for 100 ms
- The monkey fixates for 500 ms (1000 ms for animal 2) before 10 frames of this stimulus (1 second) are shown, while the monkey keeps fixating.
- The animals were seated 36 cm from the screen.

# What this looks like

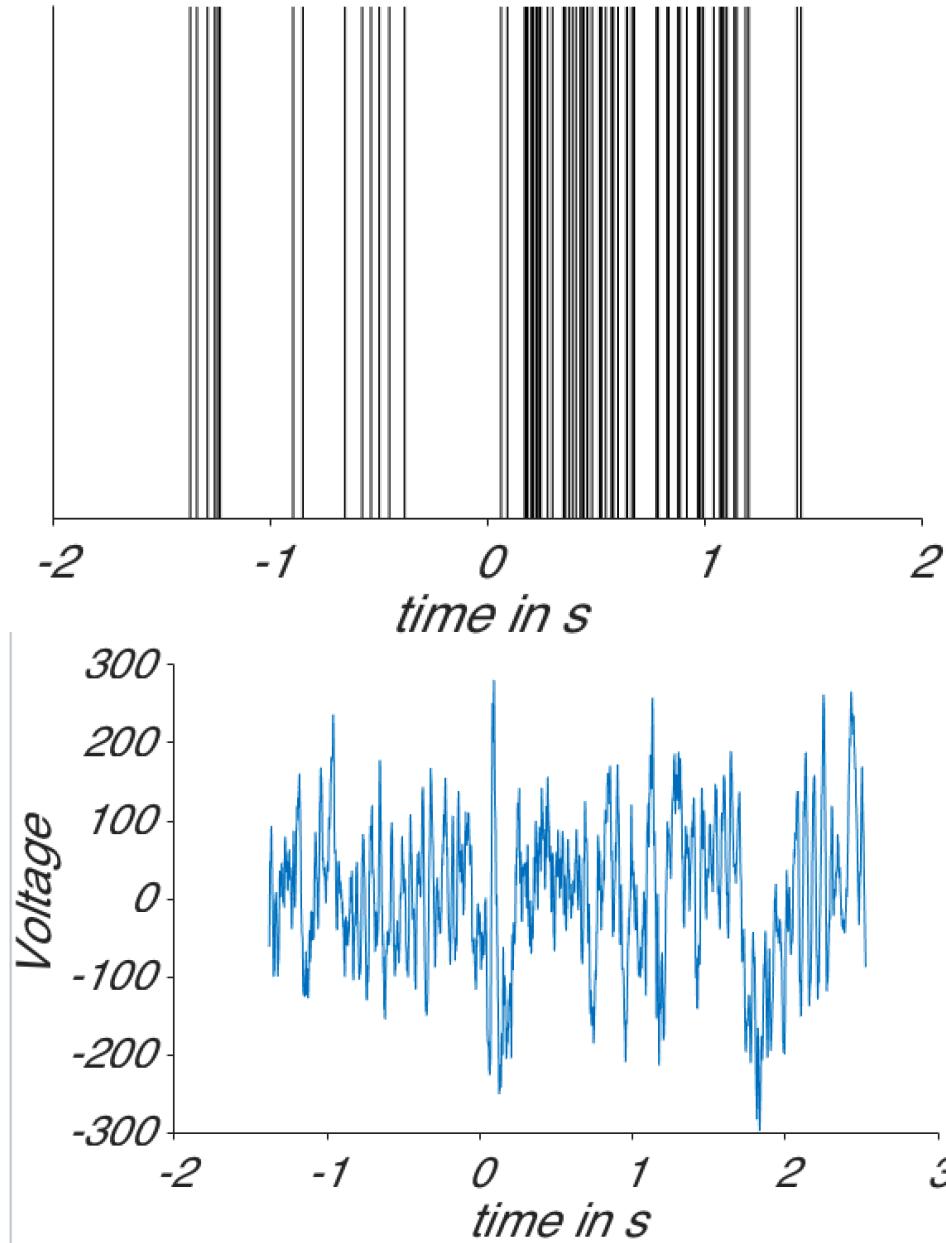


# Trial structure

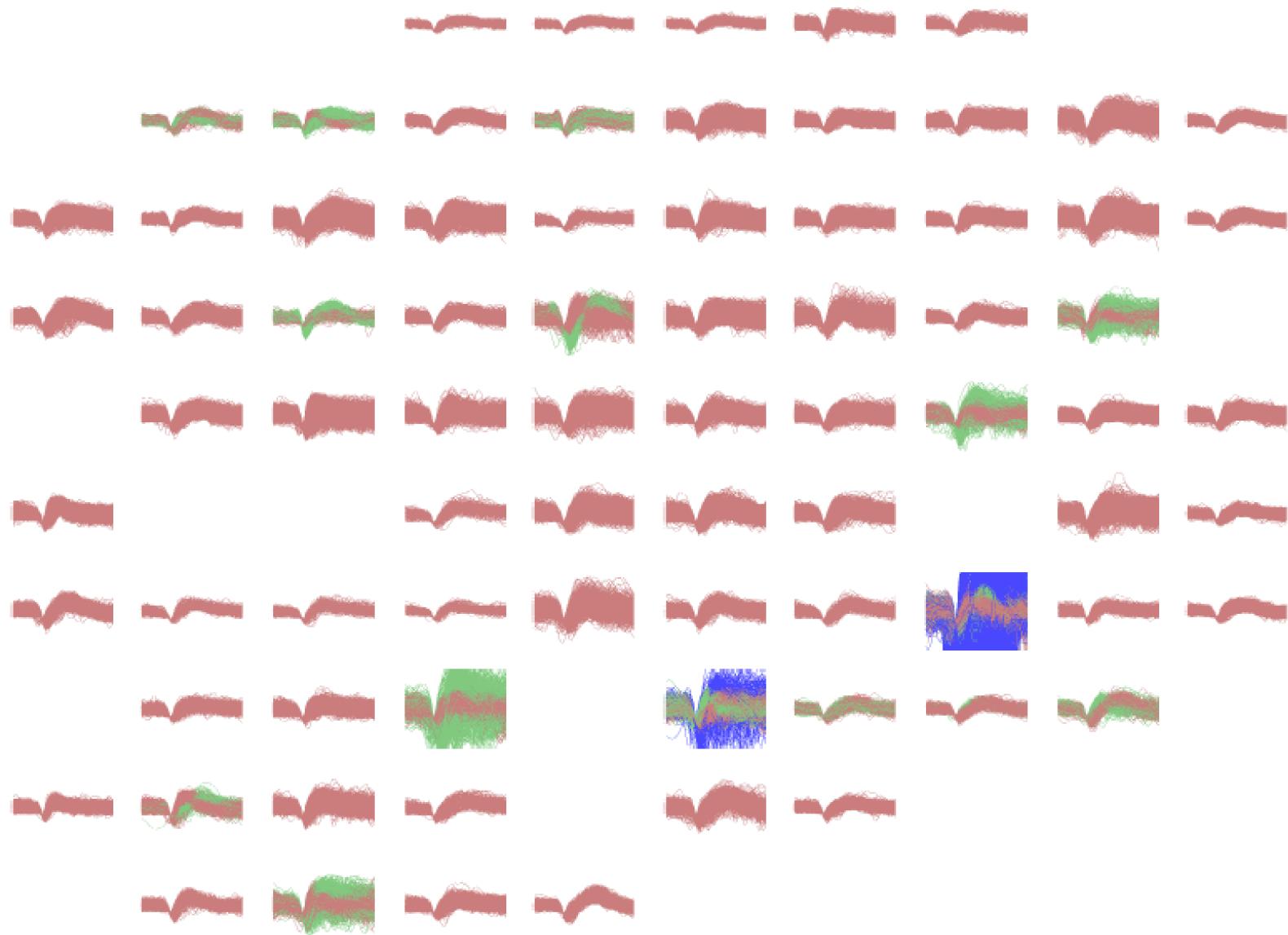


# The signals

- Raw signal (Voltage traces from 0.3 to 7500 Hz)
- Spike times (from threshold crossings of raw signal)
- LFP (low pass filtered raw signal, 0.3 to 250 Hz)
- Eye position (1000 Hz)
- Pupil diameter (1000 Hz)



# Spike sorting



# Critical variables

- **ex:** Structure that contains data from the entire experiment.
- **ex.ENV:** Structure that contains environmental parameters per condition, e.g. distance from screen.
- **ex.EVENTS:** Structure that contains spike times per condition, aligned to stimulus onset.
- **ex.LFP:** Same, but with LFP traces
- **ex.EYES:** Same, but x and y eye position as well as pupil diameter.
- **ex.NSTIME:** Time base for LFP and eye traces
- **ex.REPEATS:** How often a unique condition was repeated

# General data structure

- There are 33 units from animal 1 and 31 from animal 2. Where applicable, these make up the first dimension of the cell array.
- However, there are LFPs from all 96 channels.
- The 2<sup>nd</sup> dimension of the cell array is typically the unique condition, 1-1000.
- The 3<sup>rd</sup> dimension is the nth of repeats of \*that\* particular condition. Usually: Just 1.