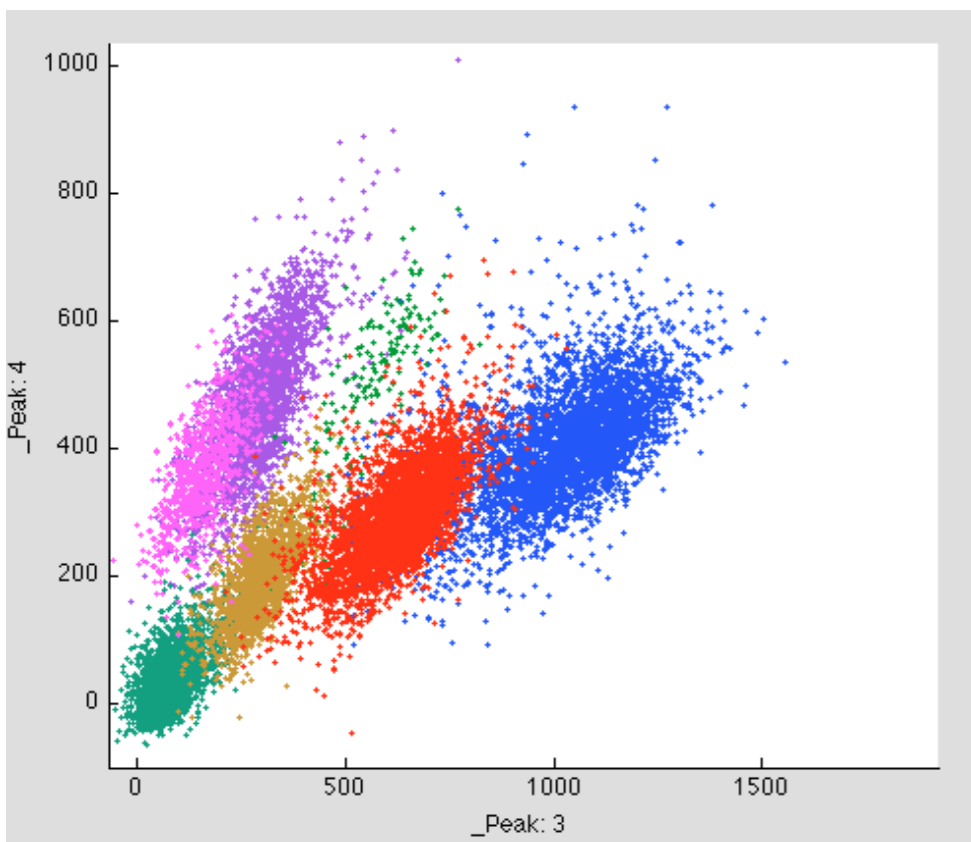
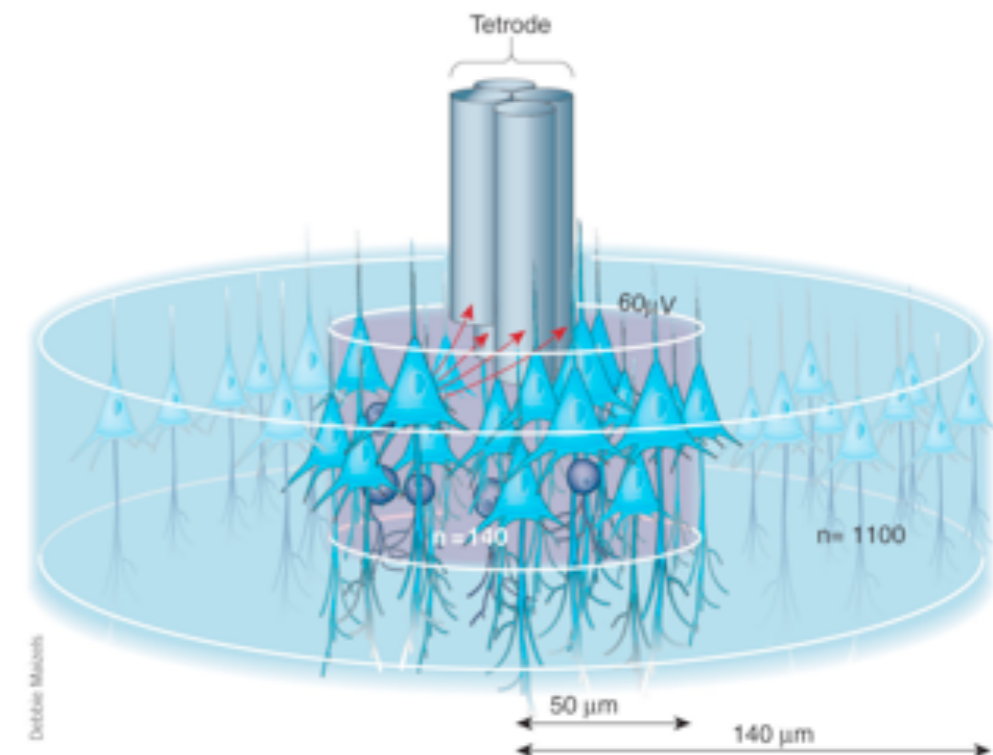


Tetrode Sorting (cutting) using Mclust

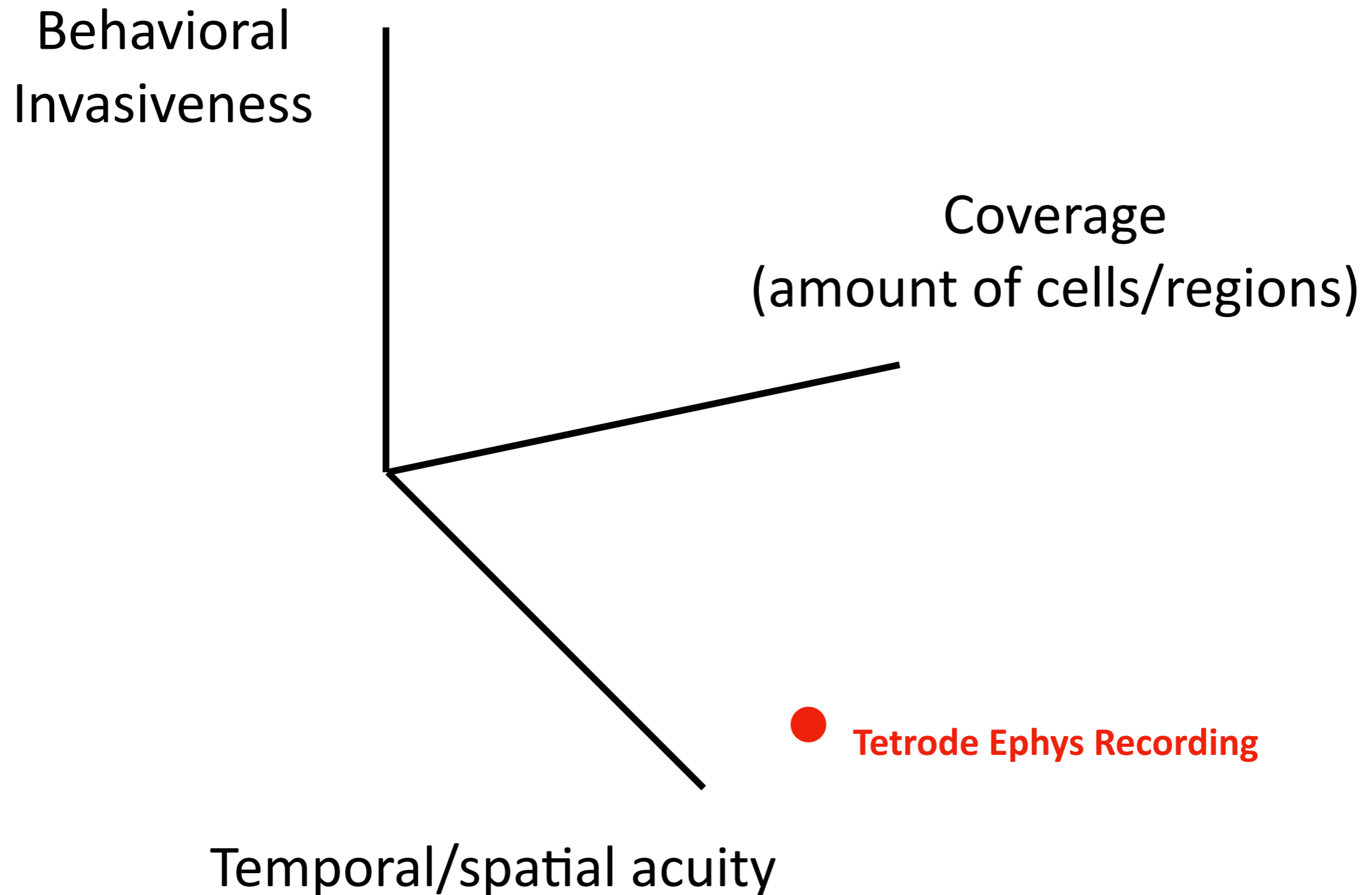
or: the science of Giving to Airy Nothingness a
Local habitation and a name.



Nate Powell
March 16, 2018



recording/imaging tradeoffs

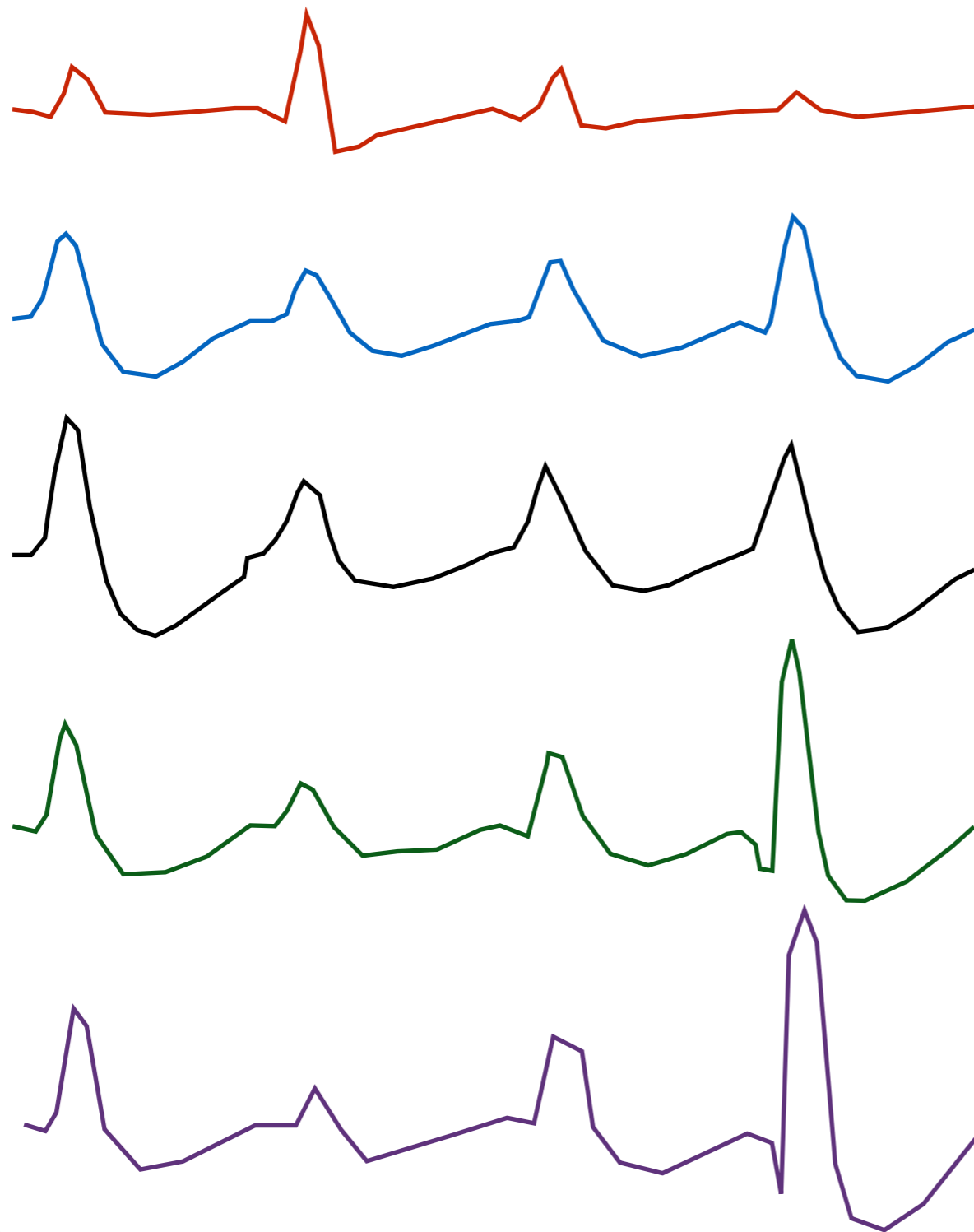


Juxtacellular Recordings

- Recordings in Awake behaving animals (typically)
- allow the precise (temporal) alignment of cell firing and behavior
- How do you maximize cell yield?

Tetrode Recordings

- Re
- Ca
- be
- Do
- can
- sess



Cell 1

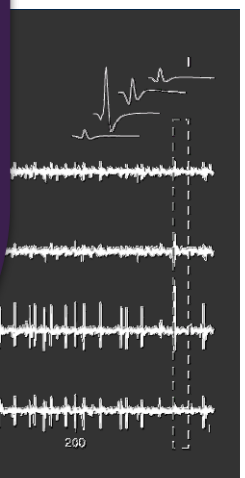
Cell 2

Cell 3

Cell 4

????

i. Large-scale
ing of neuronal
bles. Nature
nce (2004) vol. 7
p. 446-451



0 500 1000 1500
_Peak: 3

Time (ms)

Key Advantage of Tetrodes

**Improvement in sorting over single cells (by a LOT)
and over stereotrodes (by a measurable amount)**

**Why tetrodes rather than triodes?
(I think its just a practical concern)**

THE DRIVE (or Hyperdrive!)



GOLD STANDARD

Um.. there generally is none...

BE CAREFUL: Here be dragons.

**This is the reason this becomes as much an art as a science,
and you have to make your own decisions.**

Cluster Cutting Rules of Thumb:

- 1. If its cut off anywhere (peak-peak) its cut off everywhere.**
- 2. If it separates anywhere, it separates EVERYWHERE (but be careful of odd features).**

MClust

**Written by David Redish, UMN. Available free on the internet (google MClust redish to get the right one)
Runs in matlab.**

I personally prefer it over the MASSIVELY expensive alternatives, but opinions may vary. Very modular, many good options, and helpful plugins.

NOTE: I use Mclust 3.5 because I'm very old and its what I'm used to.

Current version is Mclust 4.4.

I don't like the new version as much, but Dave does...

KlustaKwik

Automated sorting algorithm written by Ken Harris, many years ago that has undergone multiple updates mostly for speed.

Mclust is designed to incorporate this as a first step, which I think greatly speed up the process and leads to increased accuracy. But mileage may vary.

There are MANY algorithms now, and I wasn't planning on talking about them today... this is more of a practically focused talk.

Complexities:

- Ghosts...
- Recording cells across multiple days
- Changes in Waveform Shape... (bursting?)
- Drift happens.
- Turning strategies?
- What can I do about my cut off cells?

Complexities:

- Saved Files and Loading... (huh, I forgot to look this up really...)
- *** KEY POINT: what are we saving here really?***