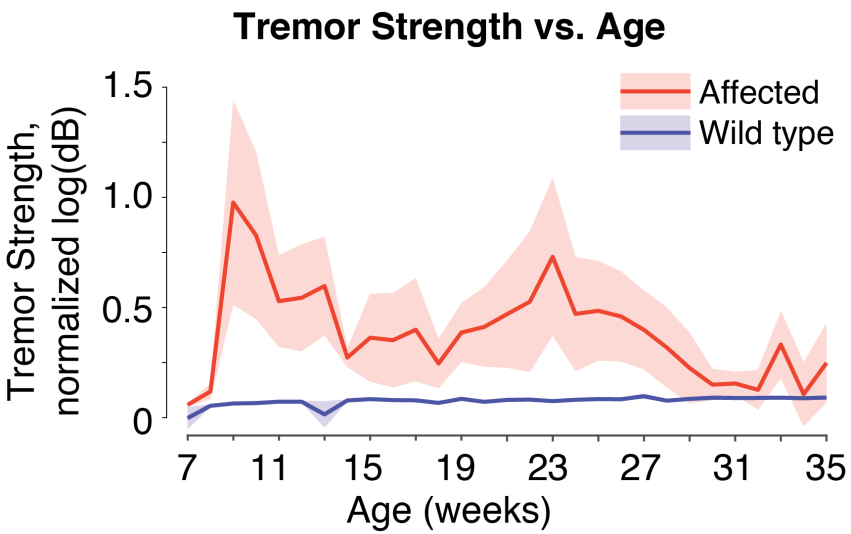
# Main Tasks

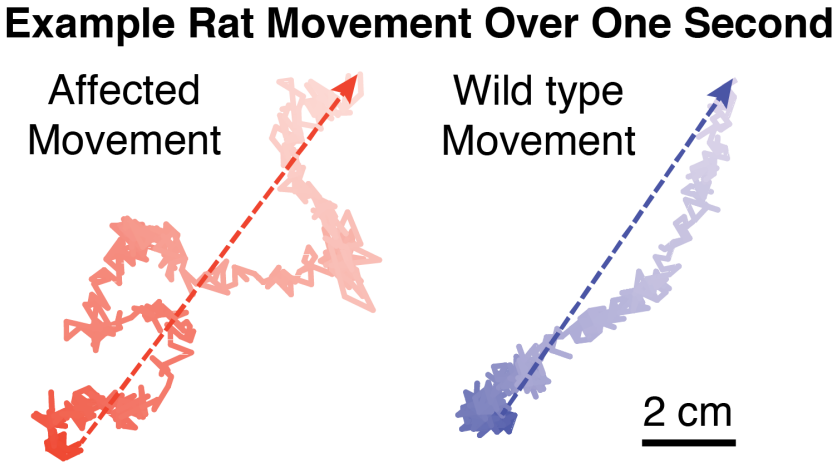
1. Rat Colony Maintenance
2. Motor Analysis
3. Standard Electrode DCS Optimization
4. New Electrodes for Improved DCS
5. Electrophysiological Recording
6. Papers
7. Grants

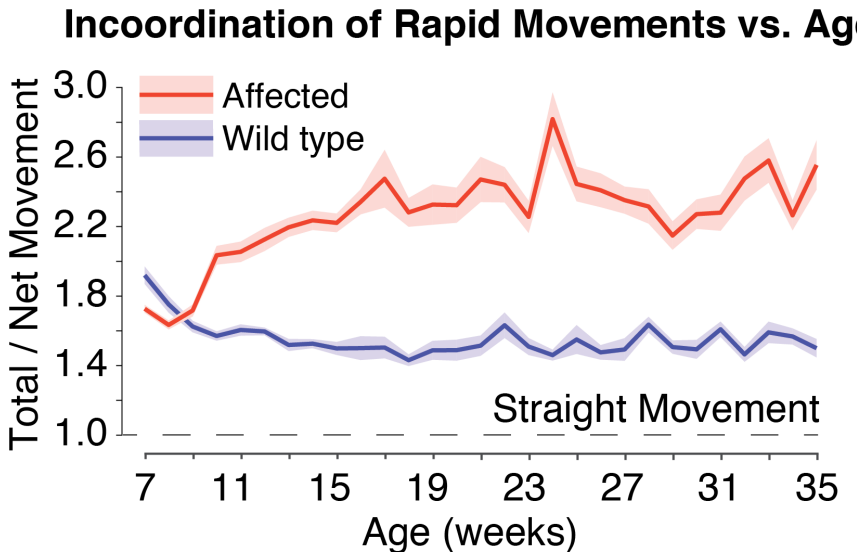
# Colony Maintenance

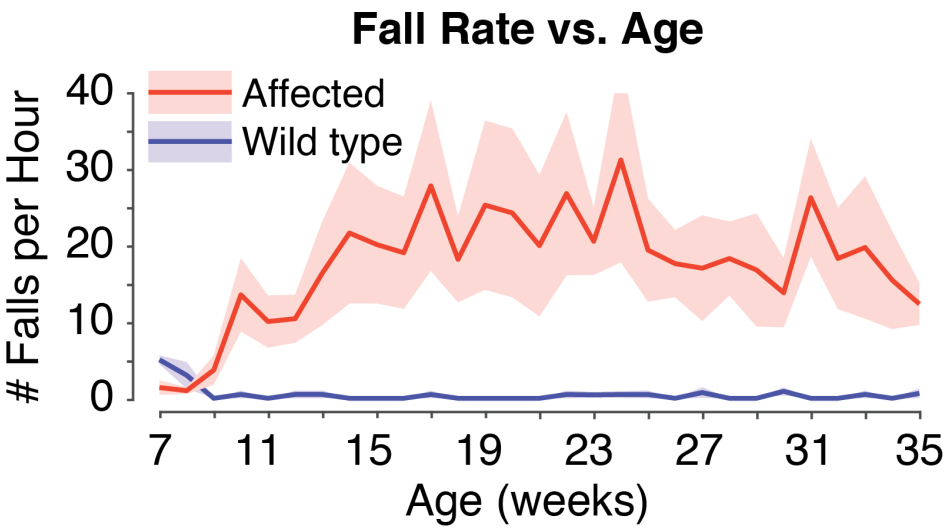
- Previous set of litters sequenced. SLC9A6 still holds up: males with deletion and females with two deletions are all affected by now; no other rats affected.
- New breeding pairs designed; will be set up tomorrow.
- Keeping cage count as minimal as possible, but it will grow with experiments and breeding.

# Previous Motor Data



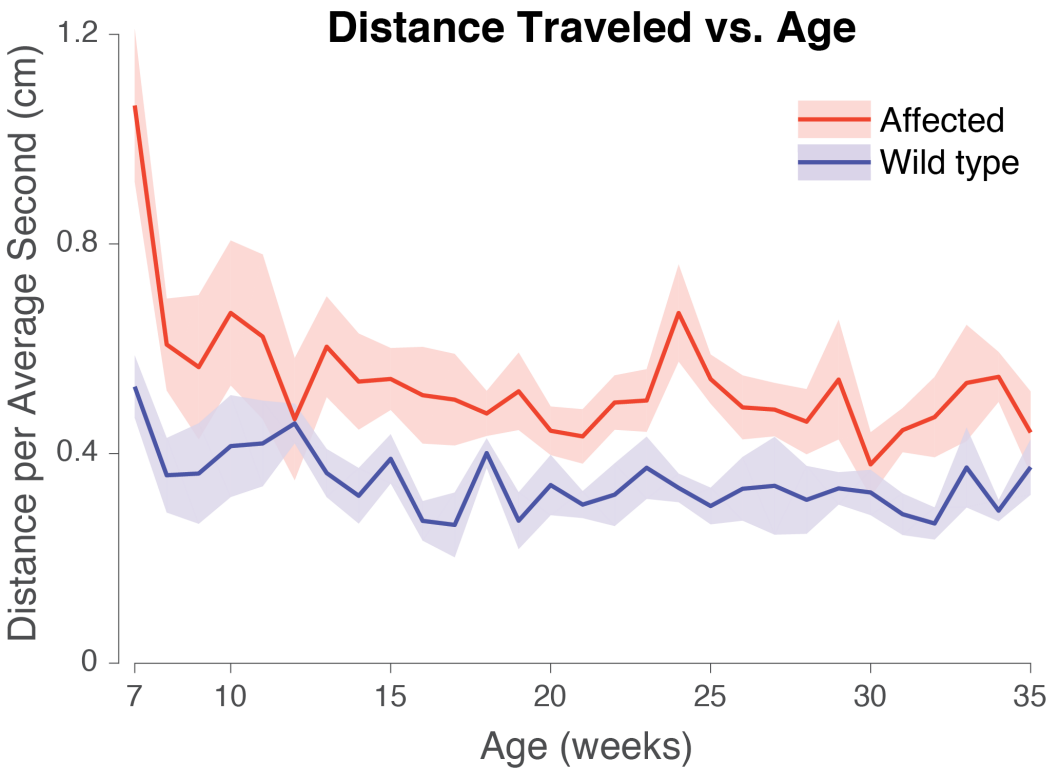



# Motor Analysis

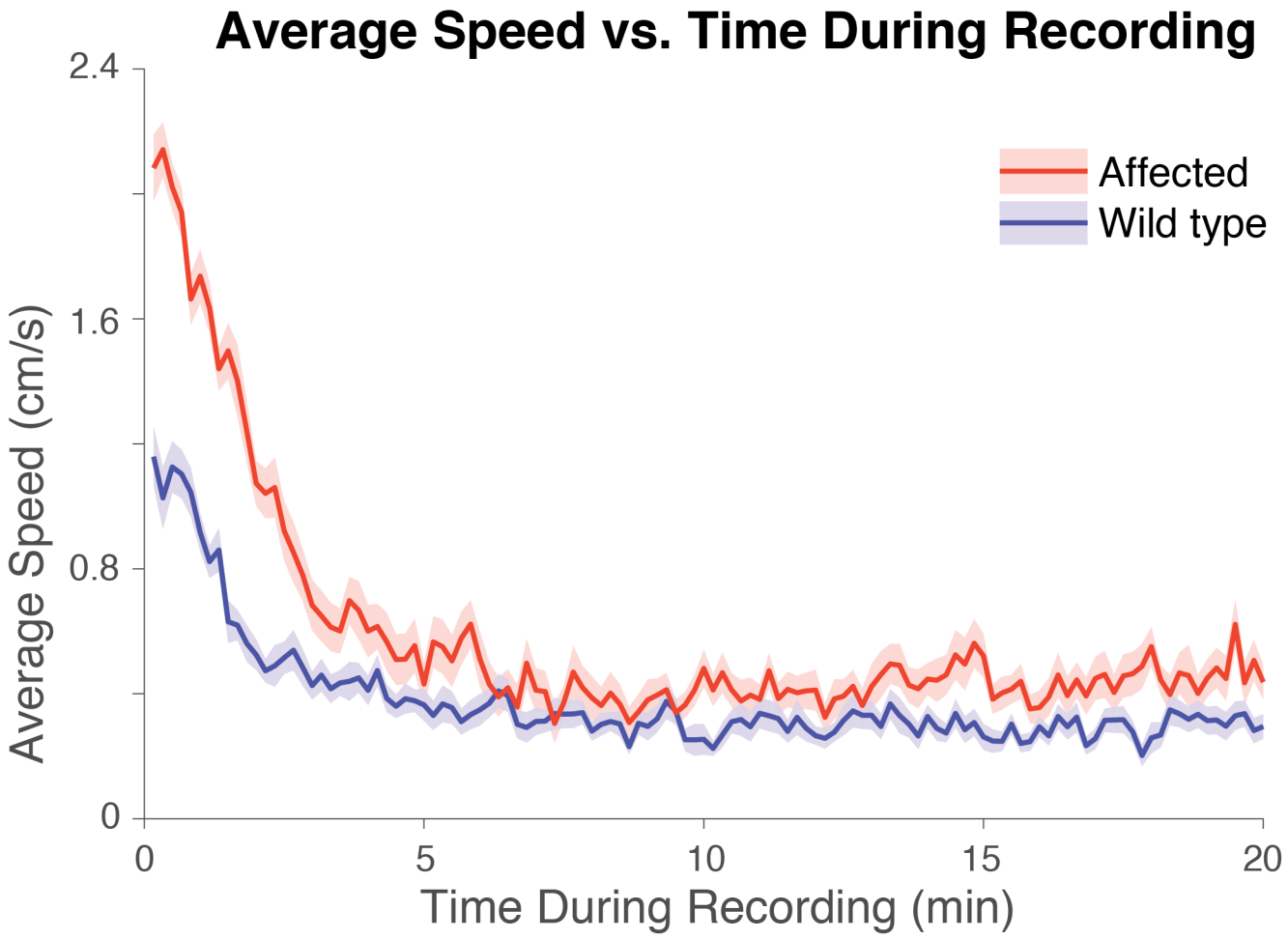
- New need: distance traveled, accounting for system noise and tremor/ incoordination.
  - Achievable through combination of custom filters, low-pass filters, running averages, and down-sampling.
- Motivation is multifaceted:
  - Order of presentation matters.
  - Falls vs time is incomplete story.




Shakers explore more than wild type counterparts!

# Taking the analysis further...

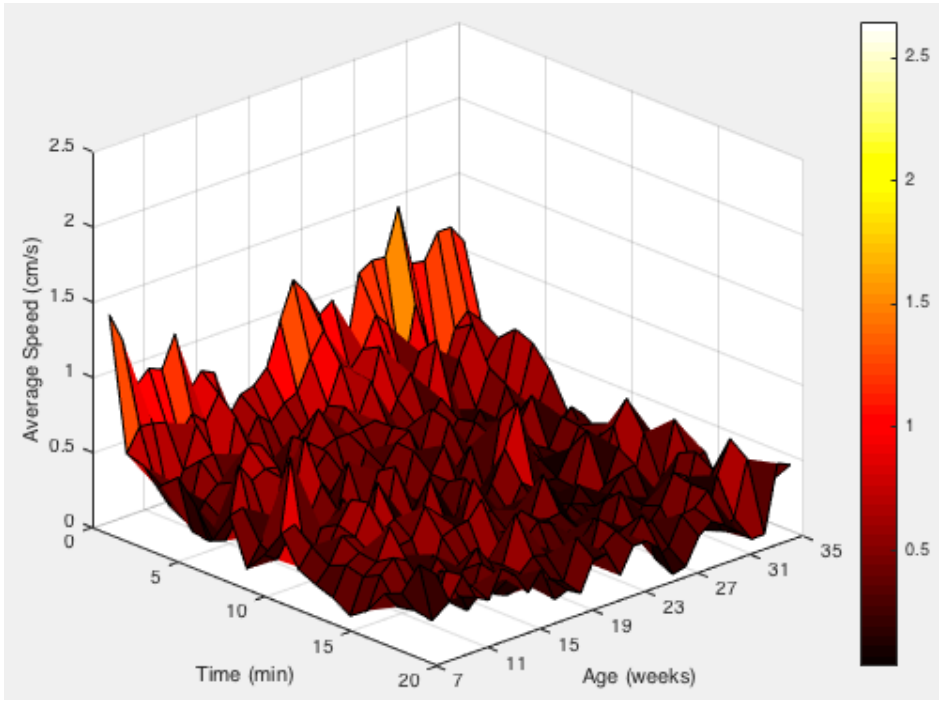
- Clearly, repeated presentation reduces exploration.
- But, how does time point in recording influence exploration?



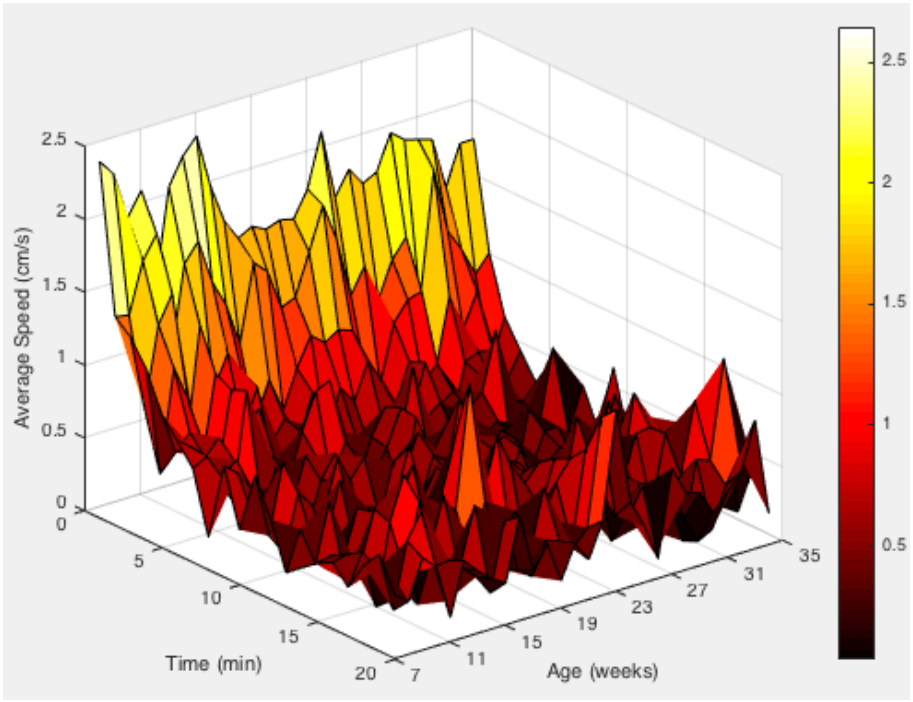

Even when losing interest, shakers explore more than wild types!

# How does the overall trend stack across both of these?

Wild Type

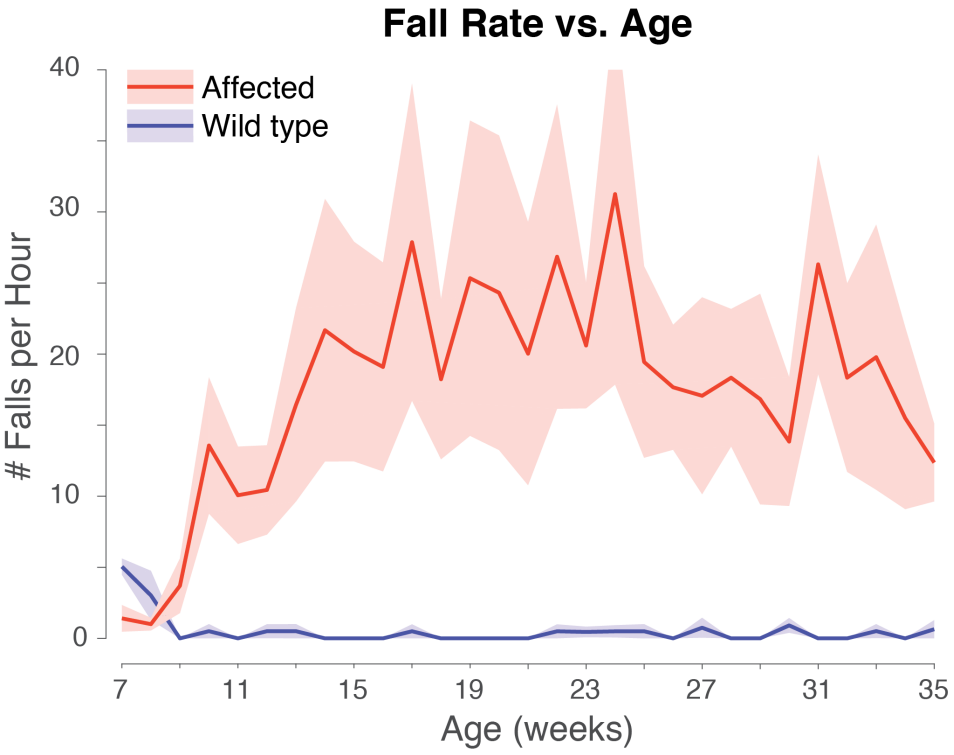


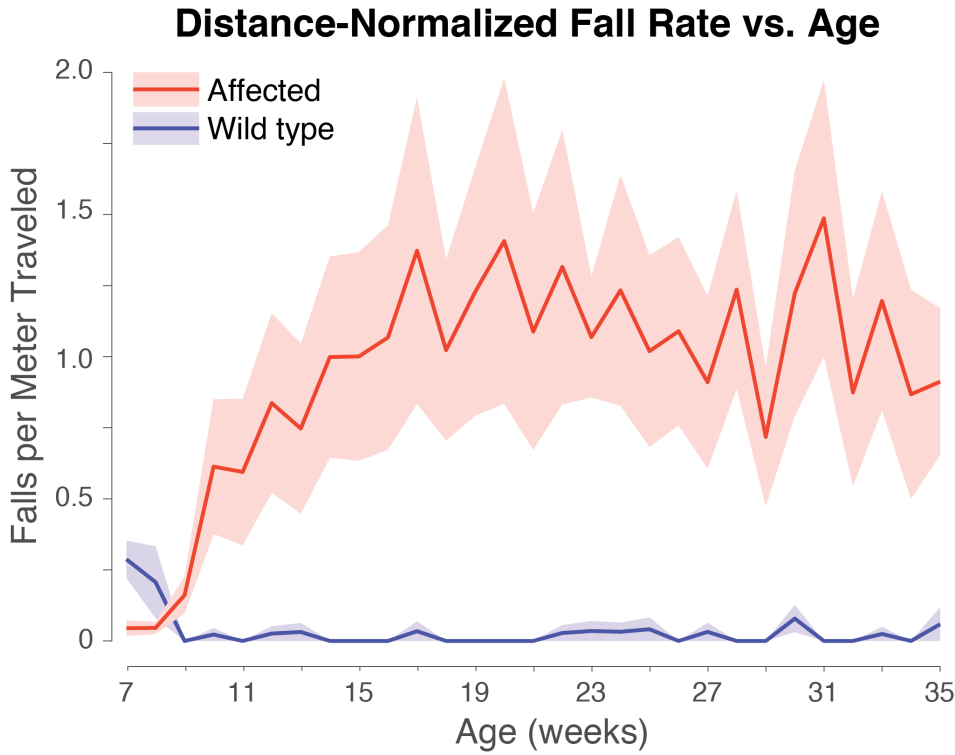

*Shaker*




Clearly, we must normalize metrics like falls based on distance traveled.

# Falls vs time and distance

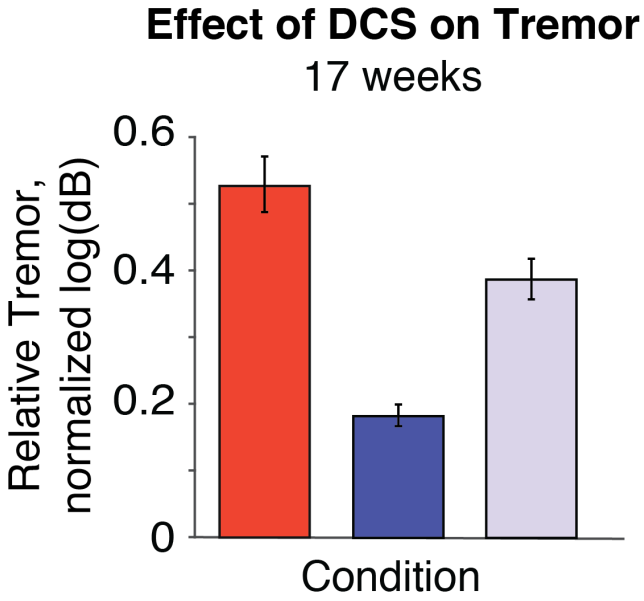


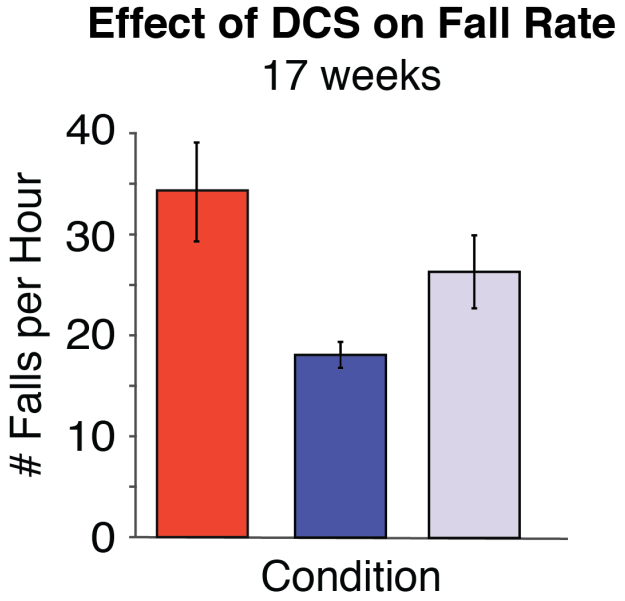



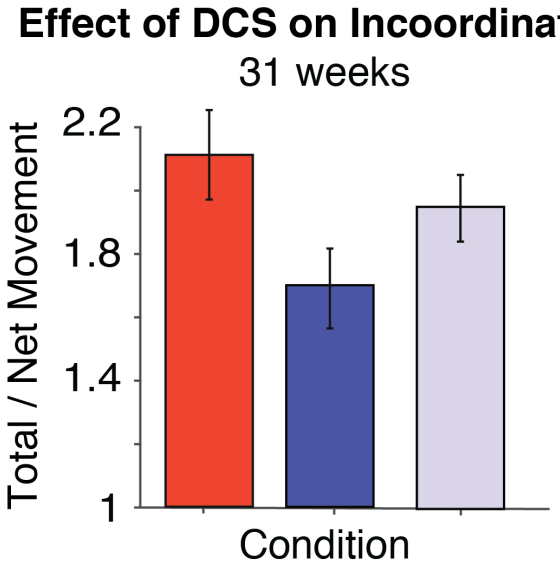
# Immediate future for analyses:

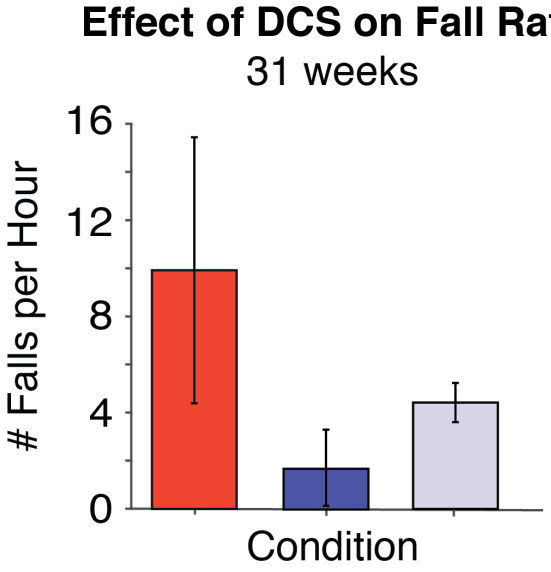
- Apply all new analyses to DCS data.

# Previous DCS Data



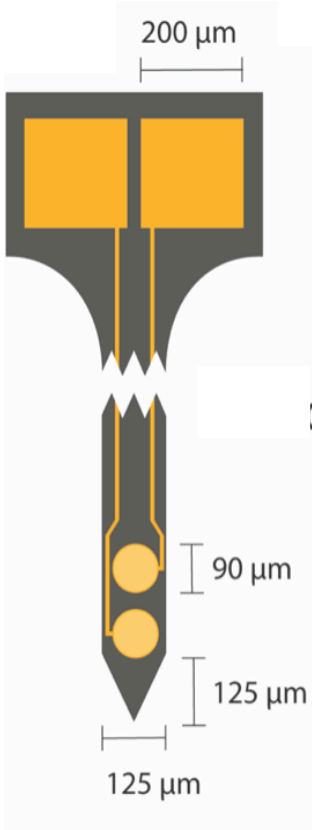



# Ongoing DCS Collection

- Batch of 10 mid-symptomatic rats currently underway.
- 3 rats bilaterally implanted with 125 micron electrodes. Recordings begin next week.
- $4^{th}$ implant today.
- 6 more implants in next 2 weeks.
- Testing a spectrum of frequencies to optimize treatment.

# New Electrodes

- Joined Nanofab, underwent safety training
- Gave talk to Nanofab staff for design feedback.
  - Now sputtering platinum, not just gold!
- In the process of designing masks and receiving tool-specific training, which corresponds with preliminary electrode build.
- Will complete fabrication process by late-October, though further iterations (much faster 2nd time) may be necessary.
- Once electrical is complete, I will wire-bond to connectors, soak test, break test, saline test
- If all good, then implant.



# *In Vivo* Recording

- System currently being built for mid/late October delivery
- Initial Plan: Implant relatively old rats (currently aging a small cohort) and record from dentate for proof of concept.
- Next plans:
  - Longer term ephys vs motor
  - Simultaneous stim/record to test that treatment reduces covarying metrics
  - Encode covarying metrics via stim, verify via record

# Papers

- Nearly finished writing 1st paper on DCS.
- Dorval paper
- Plan to write up design, fabrication, testing, validation paper of directional rat electrode after completion this semester

# Grants

- F32 assigned to F01A, to be reviewed Nov 9-10

- Will submit AAN Neuroscience Research Training “Scholarship” ($150k over 2 years) on October 1st.