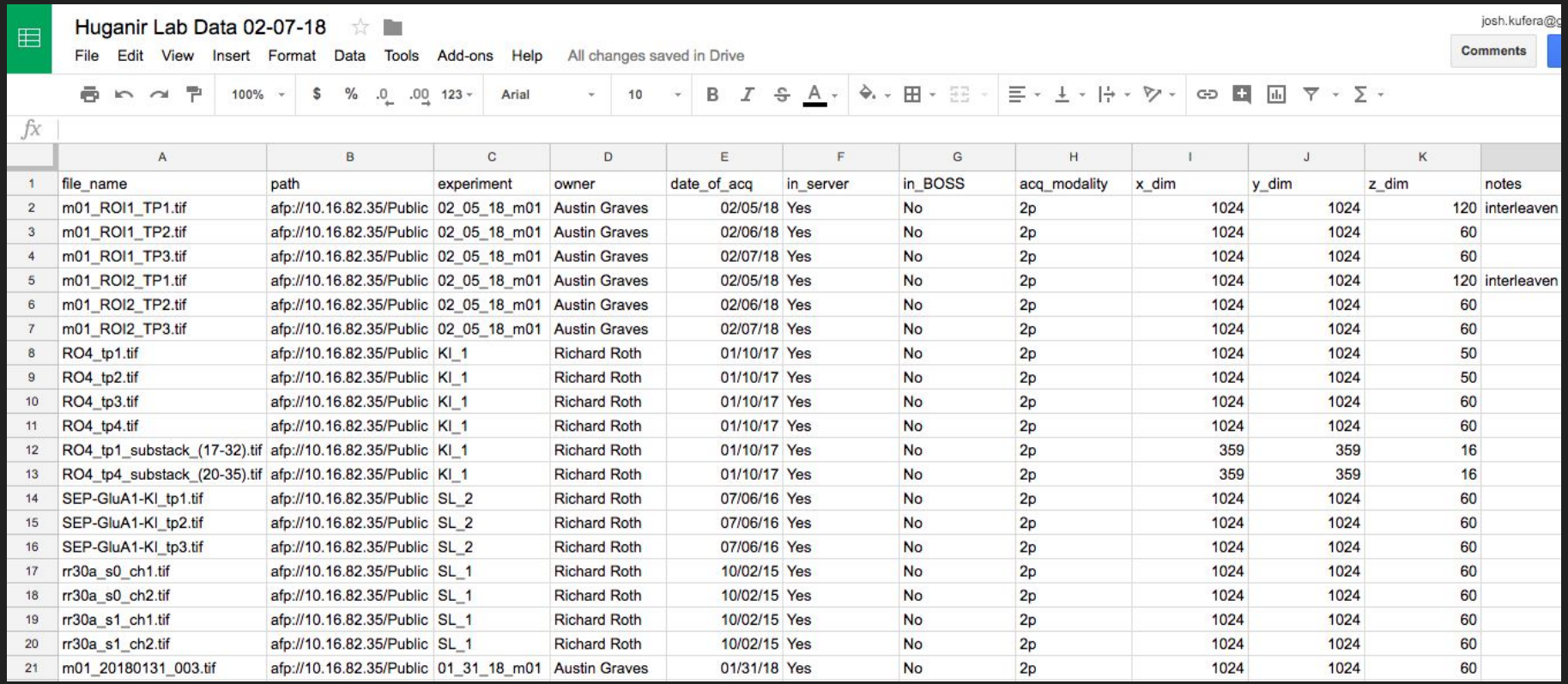
LIDS

Longitudinal *In vivo* Detection of Synapses

Statement of Work

The LIDS pipeline will ingest two-photon microscopy images of mouse cerebral cortex and autonomously detect and characterize excitatory synapses located at dendritic spines expressing AMPARs.

Table of Existing Data in Huganir Lab



Huganir Lab Data 02-07-18

File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

josh.kufera@g

Comments

100% $ % .0 .00 123 Arial 10

fx

	A	B	C	D	E	F	G	H	I	J	K	
1	file_name	path	experiment	owner	date_of_acq	in_server	in_BOSS	acq_modality	x_dim	y_dim	z_dim	notes
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3	m01_ROI1_TP2.tif	afp://10.16.82.35/Public	02_05_18_m01	Austin Graves	02/06/18	Yes	No	2p	1024	1024	60	
4	m01_ROI1_TP3.tif	afp://10.16.82.35/Public	02_05_18_m01	Austin Graves	02/07/18	Yes	No	2p	1024	1024	60	
5	m01_ROI2_TP1.tif	afp://10.16.82.35/Public	02_05_18_m01	Austin Graves	02/05/18	Yes	No	2p	1024	1024	120	interleaven
6	m01_ROI2_TP2.tif	afp://10.16.82.35/Public	02_05_18_m01	Austin Graves	02/06/18	Yes	No	2p	1024	1024	60	
7	m01_ROI2_TP3.tif	afp://10.16.82.35/Public	02_05_18_m01	Austin Graves	02/07/18	Yes	No	2p	1024	1024	60	
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9	RO4_tp2.tif	afp://10.16.82.35/Public	KI_1	Richard Roth	01/10/17	Yes	No	2p	1024	1024	50	
10	RO4_tp3.tif	afp://10.16.82.35/Public	KI_1	Richard Roth	01/10/17	Yes	No	2p	1024	1024	60	
11	RO4_tp4.tif	afp://10.16.82.35/Public	KI_1	Richard Roth	01/10/17	Yes	No	2p	1024	1024	60	
12	RO4_tp1_substack_(17-32).tif	afp://10.16.82.35/Public	KI_1	Richard Roth	01/10/17	Yes	No	2p	359	359	16	
13	RO4_tp4_substack_(20-35).tif	afp://10.16.82.35/Public	KI_1	Richard Roth	01/10/17	Yes	No	2p	359	359	16	
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15	SEP-GluA1-KI_tp2.tif	afp://10.16.82.35/Public	SL_2	Richard Roth	07/06/16	Yes	No	2p	1024	1024	60	
16	SEP-GluA1-KI_tp3.tif	afp://10.16.82.35/Public	SL_2	Richard Roth	07/06/16	Yes	No	2p	1024	1024	60	
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18	rr30a_s0_ch2.tif	afp://10.16.82.35/Public	SL_1	Richard Roth	10/02/15	Yes	No	2p	1024	1024	60	
19	rr30a_s1_ch1.tif	afp://10.16.82.35/Public	SL_1	Richard Roth	10/02/15	Yes	No	2p	1024	1024	60	
20	rr30a_s1_ch2.tif	afp://10.16.82.35/Public	SL_1	Richard Roth	10/02/15	Yes	No	2p	1024	1024	60	
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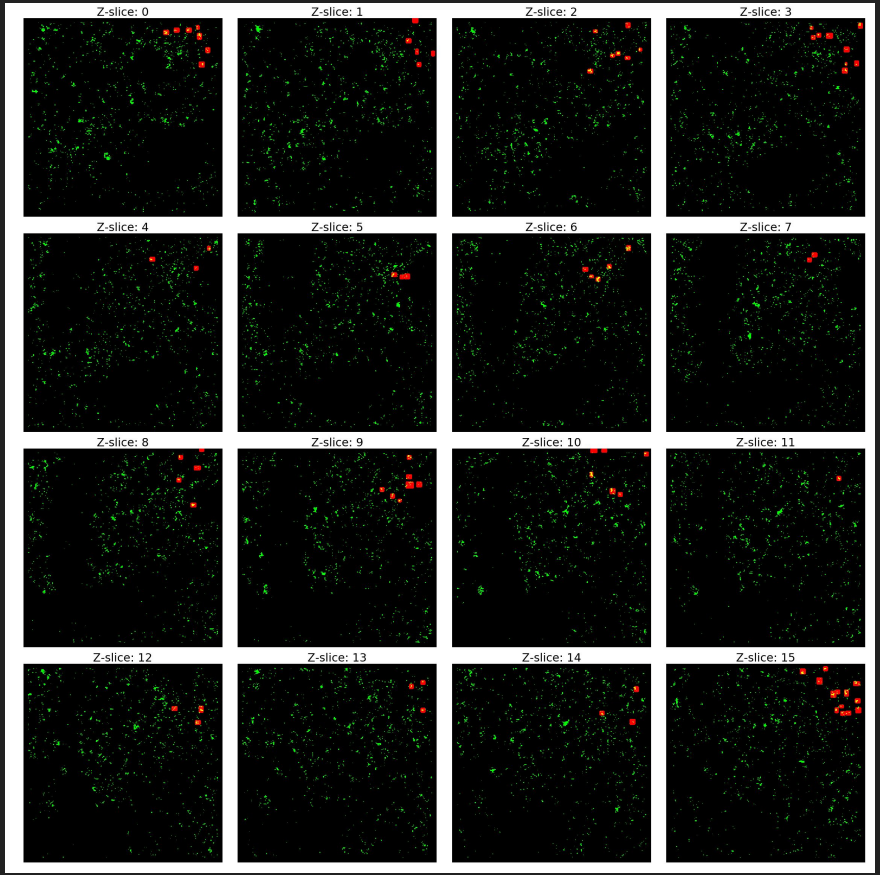
LIDS Github Pages

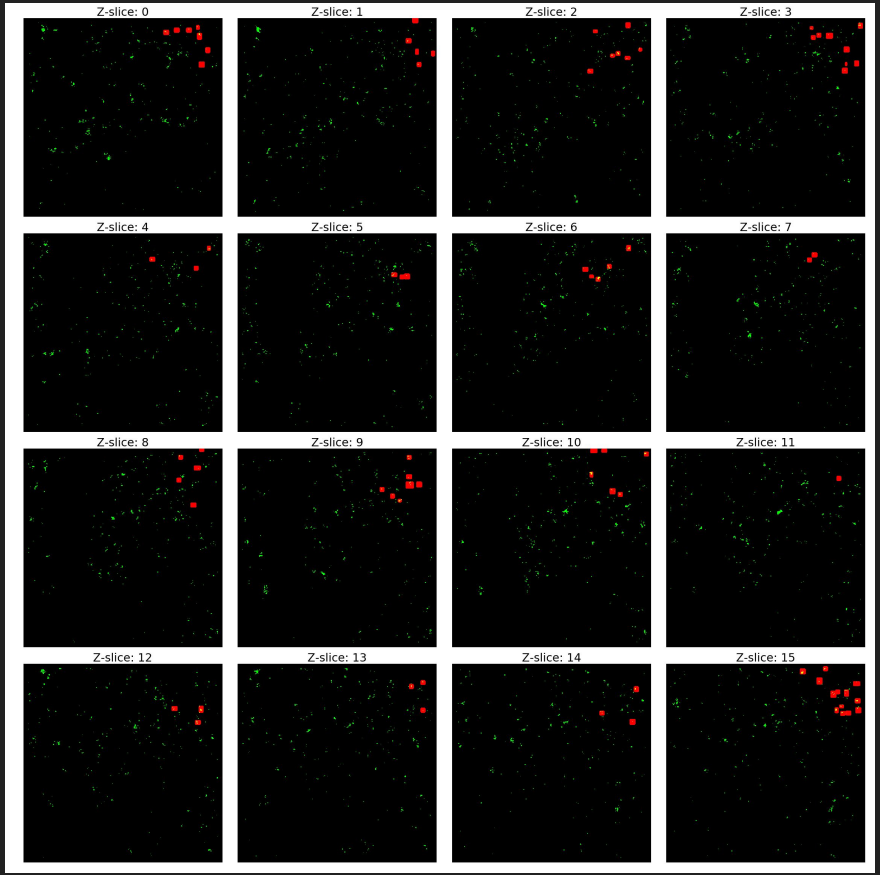
LIDS

Currently empty! Content will be added as term progresses.

Timepoint 4 annotations with predictions (slicespan)=1



Timepoint 4 annotations with predictions (slicespan)=2



Jupyter Notebook with two-photon microscopy images

Demo at end of presentation

From Last Week

- Table summarizing all existing data/data modalities
- Run PLoS code on Huganir data
- Create a central web presence for LIDS
- Learn Python
- Literature Review
  - PLoS: Probabilistic Fluorescence-based Synapse Detection

100% Complete, >50% Complete, 0% complete

For Next Week

1. Maintain central web presence for LIDS
2. Compute qualitative and quantitative performance metrics for PLoS algorithm
3. Start conversations with COBALT about using blob detection package
4. Extract 2D slices from existing data for input into Boss; separate interleaven files
    a. Green: real fluorescence
    b. Red: auto-fluorescence

Sprint 3 Goals

1. Get Huganir data into Boss
2. Establish LIDS pipeline
3. Run COBALT's blob detection package on Huganir data
    a. Compute qualitative and quantitative performance metrics for blob detection algorithm
4. Compare performance of both PLoS and blob detection algorithms on regions of synapses within a single image
5. Make collective website for all NDD teams

Pipeline

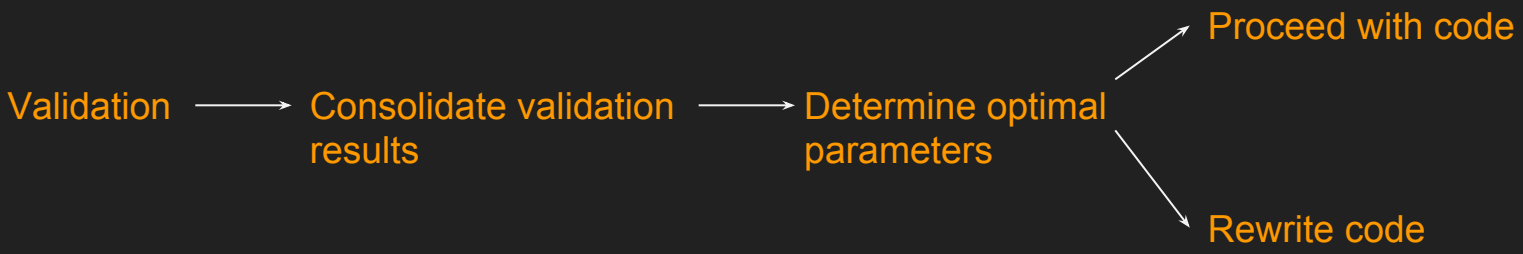
Another marker could be used to train algorithm but would not be present in all images; would be a few months of development

Learn Python

Establish BOSS ingest

Github Page

Get accustomed to Jaewon's code



Questions

Short-term: run Jaewon’s code, other diagnostic tests across timepoints?
Manual annotations not robust, no replacement for a little while, only to train

After validation is done, what next?

Semi-supervised way of doing this?

Rewrite everything?

Ananya/pipeline