

Dataset Structure and File Specification

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Two Photon Functional Scans

There are 19 mesoscope scans containing 35,000 - 57,000 imaging volumes, with each volume containing 4-8 images (1 channel x N fields). Specifics on relative field number and location, resolution, and other details can be found in the accompanying scan processing schema in the Metadata and Processed Data in the Field table. Each mesoscope scan is saved as a single TIF file. The naming convention for these files is `functional_scan_AAAAA_B_C_vD.tif`, where A is the animal id, B is the session id, C is the scan id, and D is the version. The size of each file varies with the resolution and duration of the scan, with the majority of files at ~66 GB and the largest (17797_9_6) at ~95 GB. The size of each tiff stack is $F \times H \times W$ matrix of uint16, where $H \times W$ roughly correspond to the lateral-to-medial and posterior-to-anterior axis of each imaging field, respectively, at the original pixel resolution. F is the imaging volumes x number of fields, ordered as follows (for an example with 4 fields and 1 channel):

Field 1 Channel 1 Volume 1
Field 2 Channel 1 Volume 1
Field 3 Channel 1 Volume 1
Field 4 Channel 1 Volume 1
Field 1 Channel 1 Volume 2

For 15 scans, 40000 imaging volumes were collected at ~6.3 Hz, with eight $1100 \times 620 \mu\text{m}^2$ fields per volume at 0.4 px/ μm xy resolution (440×248 px/field) to tile a $1100 \times 1200 \mu\text{m}^2$ FOV at four depths (two planes per depth, 40 μm overlap between coplanar fields). One additional scan (17797_4_9) was terminated early, and contains 35,112 imaging volumes, but is otherwise similar to the other 15 scans.

Of the remaining three scans, two (17797_9_3, 17797_9_4) contain 50000 imaging volumes collected at ~8.6 Hz, with six $1100 \times 620 \mu\text{m}^2$ fields per volume at 0.4 px/ μm xy resolution (440×248 px/field) to tile a $1100 \times 1200 \mu\text{m}^2$ FOV at three depths (two planes per depth, 40 μm overlap between coplanar fields).

The last scan (17797_9_6) contains 57000 imaging volumes collected at ~9.6 Hz, with four $1000 \times 620 \mu\text{m}^2$ fields per volume at 0.6 px/ μm xy resolution (600×372 px/field) to tile a $1000 \times 1200 \mu\text{m}^2$ FOV at two depths (two planes per depth, 40 μm overlap between coplanar fields).

All scans were raster and motion-corrected prior to upload. Raster correction is performed iteratively searching for the X shifts that maximize the cross-correlation of each row of each scan frame. Motion correction is performed by maximizing the correlation between the cross-power spectra of a single scan frame and a template image. The template image is the Gaussian-smoothed average of the Anscombe transform from the middle 2000 frames of the scan.

Changelog

v1 (7/2/2021): first public version

v2 (1/13/2023): corrected pixel over/under-flow error in export.