

Brain Image Library Data Exploration




*Finding Brain Image Library data and
tools/resources available*

Before we get started...

1. Please go to ondemand.bil.psc.edu
2. Log in with your BIL account
3. Comment in the chat if you **cannot** log in

OPEN  nDemand

OPEN  nDemand

Log in to BIL

Username

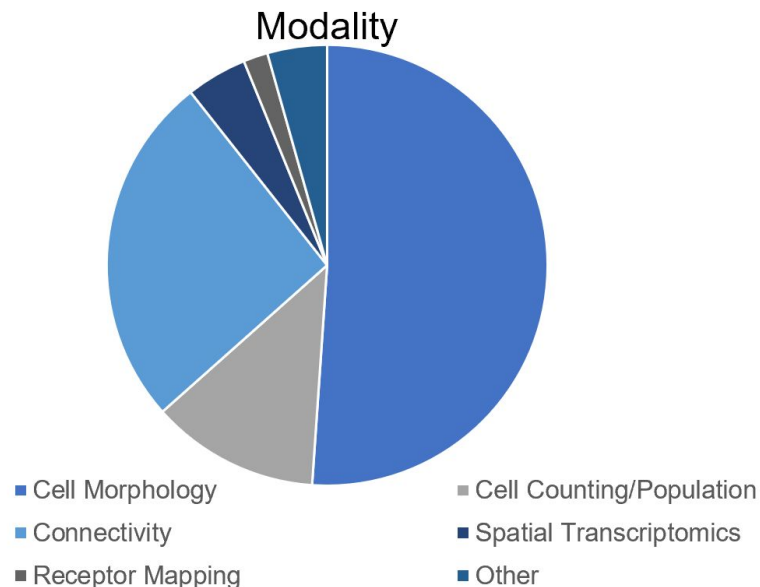
Password

Log in

What data is in BIL?

- Deposited data include:

- Organisms: mouse, marmoset, human
- Tissue: Cleared, sectioned, stained, etc.
- Microscopes: Point-scanning (Confocal, Two-photon), Lightsheet, fluorescent MOST, others
- Modalities/Experiments: Morphology, Injection tracing, Cell Counting, Brainbow, Spatial FISH (MERFISH, and others), Multi-modal (PATCHSEQ), others
- Whole (and partial) brain image datasets of mouse, rat, human, other mammals and model organisms along with their higher-level aligned and tracing data
- Targeted experiments including connectivity between cells and spatial transcriptomics (*FISH)



Overview: Where to find BIL data?

1. BIL file system
2. BIL search portal
 - <https://submit.brainimagelibrary.org/search>
3. DOI (digital object identifier)
 - Dataset DOI
 - Group DOI

1. BIL File System

Data is organized by submission in BIL

- The path to the public data utilizes the submission id number
- There are unique directories for each dataset
- The path includes sub-directories using the first 2 and then the third and fourth characters in the submission id
- Ex: collection id: abcdef0123456789

/bil/data/ab/cd/abcdef0123456789/example_dataset_01

1. BIL File System

Data is organized by submission in BIL


- The path to the public data utilizes the submission id number
- The path includes sub-directories using the first 2 and then the third and fourth characters in the submission id
- Ex: collection id: 1234abcd

/bil/data/ab/cd/abcdef0123456789/example_dataset_01

This path can be reformatted to a URL to access the data:

https://download.brainimagelibrary.org/ab/cd/abcdef0123456789/example_dataset_01/

2. Search portal - submit.brainimagelibrary.org/search

 Brain Image Library

About ▾Data Submission ▾Data Access ▾Contact

6399

public data

6

organism types

46

techniques

23

modalities

95

methods

34

grant numbers

478

anatomical structures

Active Filters: None

Add Filter:

Organism type ▾

Technique ▾

Modality ▾

Method ▾

Anatomical Structure:

Investigator:

Grant number:

Collection ID:

Download

Brain Inventory

6399 entries

(csv format)

Results: 6399

07504513d424f013

Sample:

Cortex 20201201_

CJYanma_Ex10_

PVALB+THSD7a-
Hippo-Region

004



Image and morphological reconstruction of a cortical interneuron (3b) from marmoset, Yanma, after systemic viral IV injection with AAV2/9-hDLx-GFP-fGFP, imaged in December 2020 - positive for DLX5/6-GFP, positive for Parvalbumin and negative for Thrombospondin Type 1 Domain Containing 7A.

Investigator

Guoping Feng

Feng Lab

Massachusetts Institute of Technology

Funding

1-U01-MH114819-01

Experiment

Modality: spatial transcriptomics

Method: smFISH

Technique: smFISH

Structure: Cortex

Organism: marmoset

TransLine: CJYanma

Cells: 1

[BIL: /bil/data/07/50/07504513d424f013/](#)

[HTTPS: https://download.brainimagelibrary.org/07/50/07504513d424f013/](https://download.brainimagelibrary.org/07/50/07504513d424f013/)

df75626840c76c15

Sample:

AIBS_730859101



Raw fMOST image files for ~30 mouse specimens

Investigator

Hongkui Zeng

Zeng Lab

Allen Institute for Brain Science

Funding

1-U19-MH114830-01

Experiment

Modality: cell morphology

Method: fMOST

Technique: fMOST

Structure: Whole brain

Organism: mouse

Cells: 0


[BIL: /bil/data/df/75/df75626840c76c15/mouseID_367667-18052](#)

[HTTPS: https://download.brainimagelibrary.org/df/75/df75626840c76c15/mouseID_367667-18052](https://download.brainimagelibrary.org/df/75/df75626840c76c15/mouseID_367667-18052)

1535a69f63702bca

8 mouse enhancer virus labeling two-photon serial tomography coronal image data sets

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Modality ▾
Method ▾

Anatomical
Structure:

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Grant number:

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Brain Inventory
6399 entries
(csv format)

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07504513d424f013
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CJYanma_Ex10_
PVALB+THSD7a-_
Hippo-Region
004


Image and morphological reconstruction of a cortical interneuron (3b) from marmoset, Yanma, after systemic viral IV injection with AAV2/9-hDLx-GFP-fGFP, imaged in December 2020 - positive for DLX5/6-GFP, positive for Parvalbumin and negative for Thrombospondin Type 1 Domain Containing 7A.
Investigator
Guoping Feng
Feng Lab
Massachusetts Institute of Technology
Funding
1-U01-MH114819-01
Experiment
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TransLine: CJYanma
Cells: 1
BIL: </bil/data/07/50/07504513d424f013/>
HTTPS: <https://download.brainimagelibrary.org/07/50/07504513d424f013/>

df75626840c76c15
Sample:
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Raw fMOST image files for ~30 mouse specimens
Investigator
Hongkui Zeng
Zeng Lab
Allen Institute for Brain Science
Funding
1-U19-MH114830-01
Experiment
Modality: cell morphology
Method: fMOST
Technique: fMOST
Structure: Whole brain
Organism: mouse
Cells: 0
BIL: /bil/data/df/75/df75626840c76c15/mouseID_367667-18052
HTTPS: https://download.brainimagelibrary.org/df/75/df75626840c76c15/mouseID_367667-18052

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8 mouse enhancer virus labeling two-photon serial tomography coronal image data sets

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2. Search portal - submit.brainimagelibrary.org/search

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anatomical structures

Active Filters: None

Add Filter:
Organism type ▾
Technique ▾
Modality ▾
Method ▾

Anatomical
Structure:
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Investigator:
 Name
Grant number:
 Grant Number
Collection ID:
 Collection ID
Download
Brain Inventory
6399 entries
(csv format)

Results: 6399

07504513d424f013 <i>Sample:</i> Cortex 20201201_ CJYanma_Ex10_ PVALB+THSD7a-_ Hippo-Region 004 	Image and morphological reconstruction of a cortical interneuron (3b) from marmoset, Yanma, after systemic viral IV injection with AAV2/9-hDLx-GFP-fGFP, imaged in December 2020 - positive for DLX5/6-GFP, positive for Parvalbumin and negative for Thrombospondin Type 1 Domain Containing 7A. Investigator Guoping Feng Feng Lab Massachusetts Institute of Technology Funding 1-U01-MH114819-01 Experiment <i>Modality:</i> spatial transcriptomics <i>Method:</i> smFISH <i>Technique:</i> smFISH <i>Structure:</i> Cortex <i>Organism:</i> marmoset <i>TransLine:</i> CJYanma <i>Cells:</i> 1 BIL: /bil/data/07/50/07504513d424f013/ HTTPS: https://download.brainimagelibrary.org/07/50/07504513d424f013/
df75626840c76c15 <i>Sample:</i> AIBS_730859101 	Raw fMOST image files for ~30 mouse specimens Investigator Hongkui Zeng Zeng Lab Allen Institute for Brain Science Funding 1-U19-MH114830-01 Experiment <i>Modality:</i> cell morphology <i>Method:</i> fMOST <i>Technique:</i> fMOST <i>Structure:</i> Whole brain <i>Organism:</i> mouse <i>Cells:</i> 0 BIL: /bil/data/df/75/df75626840c76c15/mouseID_367667-18052 HTTPS: https://download.brainimagelibrary.org/df/75/df75626840c76c15/mouseID_367667-18052
1535a69f63702bca	8 mouse enhancer virus labeling two-photon serial tomography coronal image data sets

3. DOI - doi.brainimagelibrary.org/doi/

Brain Image Library

About ▾Data Submission ▾Data Access ▾Contact

Cell type distribution in female and male mouse brains / Nos1_GFP_M6_200525

[DOI: <https://doi.org/10.35077/gap>]

Dataset Citation:

Osten, Pavel. (2022). Cell type distribution in female and male mouse brains / Nos1_GFP_M6_200525. [Dataset / Microscopy]. Brain Image Library. <https://doi.org/10.35077/gap>

Abstract:


This project proposes to establish an Anatomical Collaboratory for Systematic Atlasing of Cell-Type Distribution and Morphology in female and male brain. This Collaboratory will apply standardized, unbiased and largely automated methods developed in the group's laboratories to atlas the distribution and morphology of >80 molecularly defined cell classes and cell type across all regions of the female and male brain. This work will yield the most comprehensive characterization of cell type anatomy in the mammalian brain to date, establishing a structural basis for building an integrated Cell Type Brain Atlas.

Methods:

No description found.

TechnicalInfo:

DATASET METADATA:	
title	Cell type distribution in female and male mouse brains / Nos1_GFP_M6_200525
GeneralModality	population imaging
Technique	other
Other	cell distribution
SPECIMEN METADATA:	
LocalID	Nos1_GFP_M6_200525
Species	Mouse
NCBITaxonomy	NCBITaxid10090



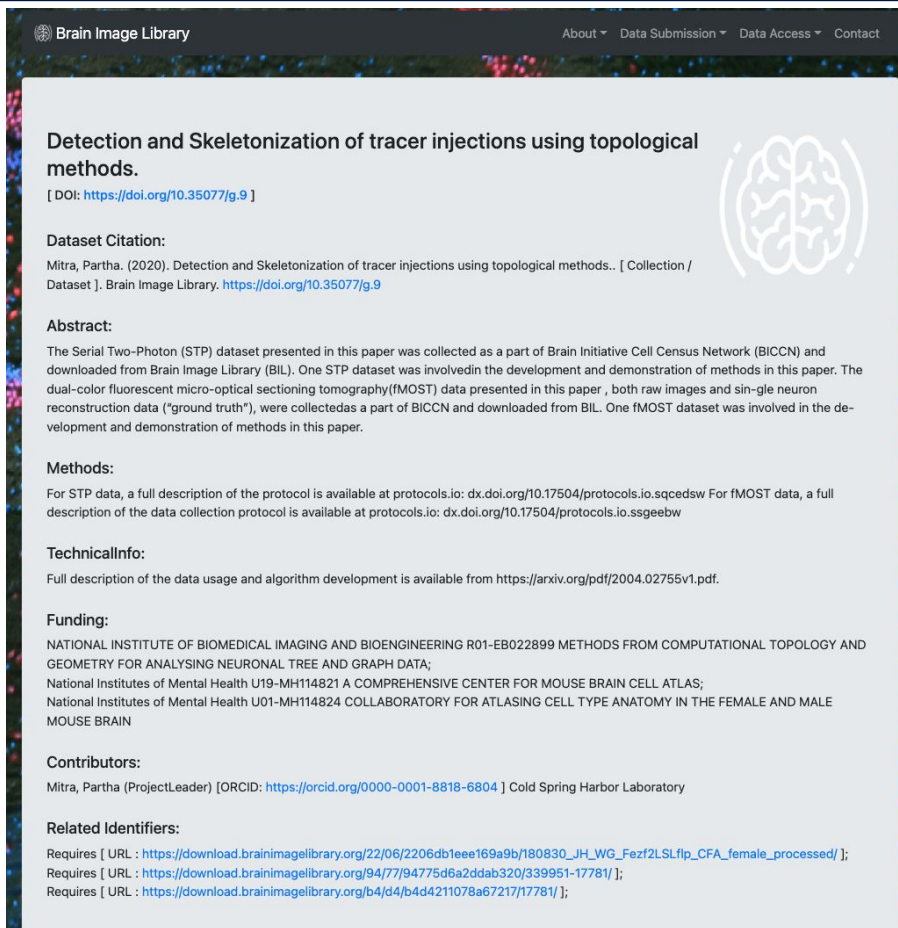
Datasets with DOIs issued will have a landing page that displays more in-depth metadata for the associated dataset:

<https://doi.brainimagelibrary.org/doi/10.35077/gap>

DOIs can also be issued for groups of related datasets:

<https://doi.brainimagelibrary.org/doi/10.35077/g.9>

3. DOI - doi.brainimagedlibrary.org/doi/



The screenshot shows a web page from the Brain Image Library. The header includes the library's name and navigation links: About, Data Submission, Data Access, and Contact. The main content area is titled "Detection and Skeletonization of tracer injections using topological methods." and includes a DOI link. Below the title is a "Dataset Citation" section with a reference to a 2020 paper by Mitra, Partha. An "Abstract" section follows, describing the Serial Two-Photon (STP) dataset and its collection as part of the Brain Initiative Cell Census Network (BICCN). A "Methods" section mentions the availability of protocols on protocols.io. A "TechnicalInfo" section provides a link to a full description of the data collection protocol. A "Funding" section lists the National Institute of Biomedical Imaging and Bioengineering and the National Institutes of Mental Health. Finally, a "Contributors" section identifies Mitra, Partha as the Project Leader. The page also includes "Related Identifiers" with links to download the dataset.

Brain Image Library About Data Submission Data Access Contact

Detection and Skeletonization of tracer injections using topological methods.

[DOI: <https://doi.org/10.35077/g.9>]

Dataset Citation:
Mitra, Partha. (2020). Detection and Skeletonization of tracer injections using topological methods.. [Collection / Dataset]. Brain Image Library. <https://doi.org/10.35077/g.9>

Abstract:
The Serial Two-Photon (STP) dataset presented in this paper was collected as a part of Brain Initiative Cell Census Network (BICCN) and downloaded from Brain Image Library (BIL). One STP dataset was involved in the development and demonstration of methods in this paper. The dual-color fluorescent micro-optical sectioning tomography (fMOST) data presented in this paper, both raw images and single neuron reconstruction data ("ground truth"), were collected as a part of BICCN and downloaded from BIL. One fMOST dataset was involved in the development and demonstration of methods in this paper.

Methods:
For STP data, a full description of the protocol is available at protocols.io: [dx.doi.org/10.17504/protocols.io.sqcedsw](https://doi.org/10.17504/protocols.io.sqcedsw) For fMOST data, a full description of the data collection protocol is available at protocols.io: [dx.doi.org/10.17504/protocols.io.ssgceb](https://doi.org/10.17504/protocols.io.ssgceb)

TechnicalInfo:
Full description of the data usage and algorithm development is available from <https://arxiv.org/pdf/2004.02755v1.pdf>.

Funding:
NATIONAL INSTITUTE OF BIOMEDICAL IMAGING AND BIOENGINEERING R01-EB022899 METHODS FROM COMPUTATIONAL TOPOLOGY AND GEOMETRY FOR ANALYSING NEURONAL TREE AND GRAPH DATA;
National Institutes of Mental Health U19-MH114821 A COMPREHENSIVE CENTER FOR MOUSE BRAIN CELL ATLAS;
National Institutes of Mental Health U01-MH114824 COLLABORATORY FOR ATLASING CELL TYPE ANATOMY IN THE FEMALE AND MALE MOUSE BRAIN

Contributors:
Mitra, Partha (ProjectLeader) [ORCID: <https://orcid.org/0000-0001-8818-6804>] Cold Spring Harbor Laboratory

Related Identifiers:
Requires [URL : https://download.brainimagedlibrary.org/22/06/2206db1eee169a9b/180830_JH_WG_Fezf2LSLflp_CFA_female_processed/];
Requires [URL : <https://download.brainimagedlibrary.org/94/77/94775d6a2ddab320/339951-17781/>];
Requires [URL : <https://download.brainimagedlibrary.org/b4/d4/b4d4211078a67217/17781/>];

Datasets with DOIs issued will have a landing page that displays more in-depth metadata for the associated dataset:


https://doi.brainimagedlibrary.org/doi/10.35077/ga_b

DOIs can also be issued for groups of related datasets:

<https://doi.brainimagedlibrary.org/doi/10.35077/g.9>

Metadata version updates

Version 1

07504513d424f013	Image and morphological reconstruction of a cortical interneuron (3b) from marmoset, Yanma, after systemic viral IV injection with AAV2/9-hDlx-GFP-fGFP, imaged in December 2020 - positive for DLX5/6-GFP, positive for Parvalbumin and negative for Thrombospondin Type 1 Domain Containing 7A.	
Sample:		
Cortex 20201201_		
CJYanma_Ex10_	Investigator	Experiment
PVALB+THSD7a-_-	Guoping Feng	Modality: spatial transcriptomics
Hippo-Region	Feng Lab	Method: smFISH
004	Massachusetts Institute of Technology	Technique: smFISH
	Funding	Structure: Cortex
	1-U01-MH114819-01	Organism: marmoset
		TransLine: CJYanma
		Cells: 1
	BIL: /bil/data/07/50/07504513d424f013/	
	HTTPS: https://download.brainimaginglibrary.org/07/50/07504513d424f013/	

- The latest BIL metadata version was implemented at the beginning of this year
- The version 2 includes more fields and descriptive metadata
- All BIL data is in the process of being updated to the newest version where possible
- BRAIN Standards
(<https://doi.org/10.1038/s41597-022-01562-5>)

Version 2

TechnicalInfo:

DATASET METADATA:

title	Cell type distribution in female and male mouse brains / Nos1_GFP_M6_200525
GeneralModality	population imaging
Technique	other
Other	cell distribution

SPECIMEN METADATA:

LocalID	Nos1_GFP_M6_200525
Species	Mouse
NCBITaxonomy	NCBI:txid10090
Age	unknown
Ageunit	Days
Sex	Male
Genotype	R26-CAG-LSL-H2B-GFP/R26-CAG-LSL-H2B-GFP; nNos1/nNos1
OrganName	Brain
SampleLocalID	Nos1_GFP_M6_200525

INSTRUMENT METADATA:

MicroscopeType	Two Photon
MicroscopeManufacturerAndModel	TissueVision

IMAGE METADATA:

xAxis	superior-to-inferior
yAxis	right-to-left
zAxis	anterior-to-posterior
Number	1,2,red,green
displayColor	(1.0, 0.0, 0.0),(0.0, 1.0, 0.0)
stepSizeX	4 micron/pixel
stepSizeY	4 micron/pixel
stepSizeZ	53 micron/pixel

Tools Available at BIL

Computational Resources (at no cost to users)

- [BIL Analysis Ecosystem](#)
 - Flexible resource that is made up of several large memory machines equipped with modern GPUs
- [Bridges-2](#)
 - NSF funded supercomputer located at the Pittsburgh Supercomputing Center.
- [Neocortex](#)
 - Neocortex is a resource that targets AI-powered scientific discovery and provides hardware for the development of efficient algorithms for artificial intelligence and graph analytics.

Tools available to access some of these resources:

- [Open OnDemand](#)
 - Open OnDemand is an open-source portal that enables web-based access to HPC services
 - Jupyter Lab
 - RStudio
 - File System Interface
- [X2Go](#)
 - X2Go is open source remote desktop software and gives remote access to a Linux system graphical user interface.
- [TGX](#)
 - TGX is a remote desktop for low-latency remote desktop workstation for intensive graphics applications up to 4K resolution.

BIL Analysis Ecosystem

Access to the BIL Analysis Ecosystem is granted to all BIL users upon account creation.

Large Memory Compute Nodes (L nodes)

Number of nodes: 8 (I001 - I008)

- Processors: HPE ProLiant DL580 Gen9
- Cores per node: 80 - 20 per CPU
- RAM: 3TB
- CPU per node: 4
- CPU model: Xeon E7 8870



Bridges-2

<https://www.psc.edu/resources/bridges-2/>

Bridges-2 is available at no cost for research and education, and at cost-recovery rates for other purposes.

Regular memory nodes: 256GB - 512GB RAM (488 RM nodes have 256GB of RAM, and 16 have 512GB of RAM)

Extreme memory nodes: 4TB RAM (4 nodes)

GPU nodes: 512GB of RAM (Eight NVIDIA Tesla V100-32GB SXM2 GPUs) (24 GPU nodes)

The BIL file system is mounted on Bridges 2 so all data is directly accessible on these resources.

Bridges-2 is allocated through ACCESS. More information on ACCESS allocations and information on how to get started is available here: <https://allocations.access-ci.org/>





Carnegie
Mellon
University



Reach out with questions!

bil-support@psc.edu

If you ever have a question about a specific dataset or how to find data, please reach out!

Mariah Kenney

Data Curator and Metadata Librarian