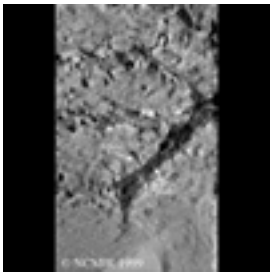
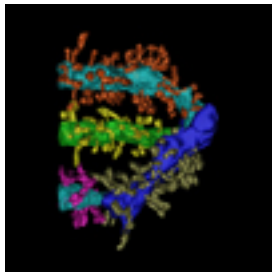
Cell Centered Database

University of California, San Diego

Maryann Martone

Microscopy Product #:3494 osaka1r

For the most updated information, please visit
http://ccdb.ucsd.edu/CCDBWebSite/main?event=displaySum&mpid=3494

Image2D	Reconstruction	Segmentation
		

Project Information:

PROJECT_ID	P1119
PROJECT_NAME	Correlated Microscopy of Dendritic Spines
PROJECT_DESCRIPTION	Measurements of spine parameters using light microscopy and electron tomography
LEADER	Maryann Martone
FUNDING_AGENCY	NIH
PROJECT_START_DATE	1992-01-01 00:00:00.0
PROJECT_END_DATE	
COLLABORATORS	Naoko Yamada; Gordun Arbuthnott; Cali Ingham; Stephen Young
PUBLICATION1	
PUBLICATION2	
PUBLICATION3	

Experiment Information -	
PURPOSE	how well dendritic spines can be detected and measured using LM
TITLE	spiny dendrite
EXPERIMENTER	Naoko Yamada
EXPERIMENT_NAME	
EXPERIMENT_DATE	

Subject Information -	
GROUP_BY	
SUBJECT_NAME	
FIXATION_METHOD_ID	
SCIENTIFIC_NAME	rattus norvegicus
SPECIES	rat
STRAIN	Sprague Dawley
AGE	
AGECLASS	adult
ANIMAL_NAME	
LITTER_ID	
SEX	unspecified
VENDOR	
WEIGHT	

Tissue -	
ANATOMIC_LOCATION	cerebellum
MICROTOME	Ultramicrotome
ORIENTATION	sagittal
THICKNESS	4 um
TISSUE_PROD_STORAGE	
EXTERNAL_FILE_NAME	
TISSUE_GROUP_TYPE	

Microscopy Product Information -	
MICROSCOPY_PRODUCT_ID	3494
IMAGE_BASENAME	osaka1r
CREATE_DATE	
INSTRUMENT	Hitachi 3MeV UHVEM
MICROSCOPE_TYPE	UHVEM
PLANE_COUNT	
PRODUCT_TYPE	SINGLE TILT
PURL	
SESSION_NAME	
TELESCIENCE_SRB	P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494
X_RESOLUTION	nm/pixels
Y_RESOLUTION	nm/pixels
XSIZE	
YSIZE	

Protocol:

Intracellular injection with Lucifer Yellow followed by photooxidation.

Image Type -	

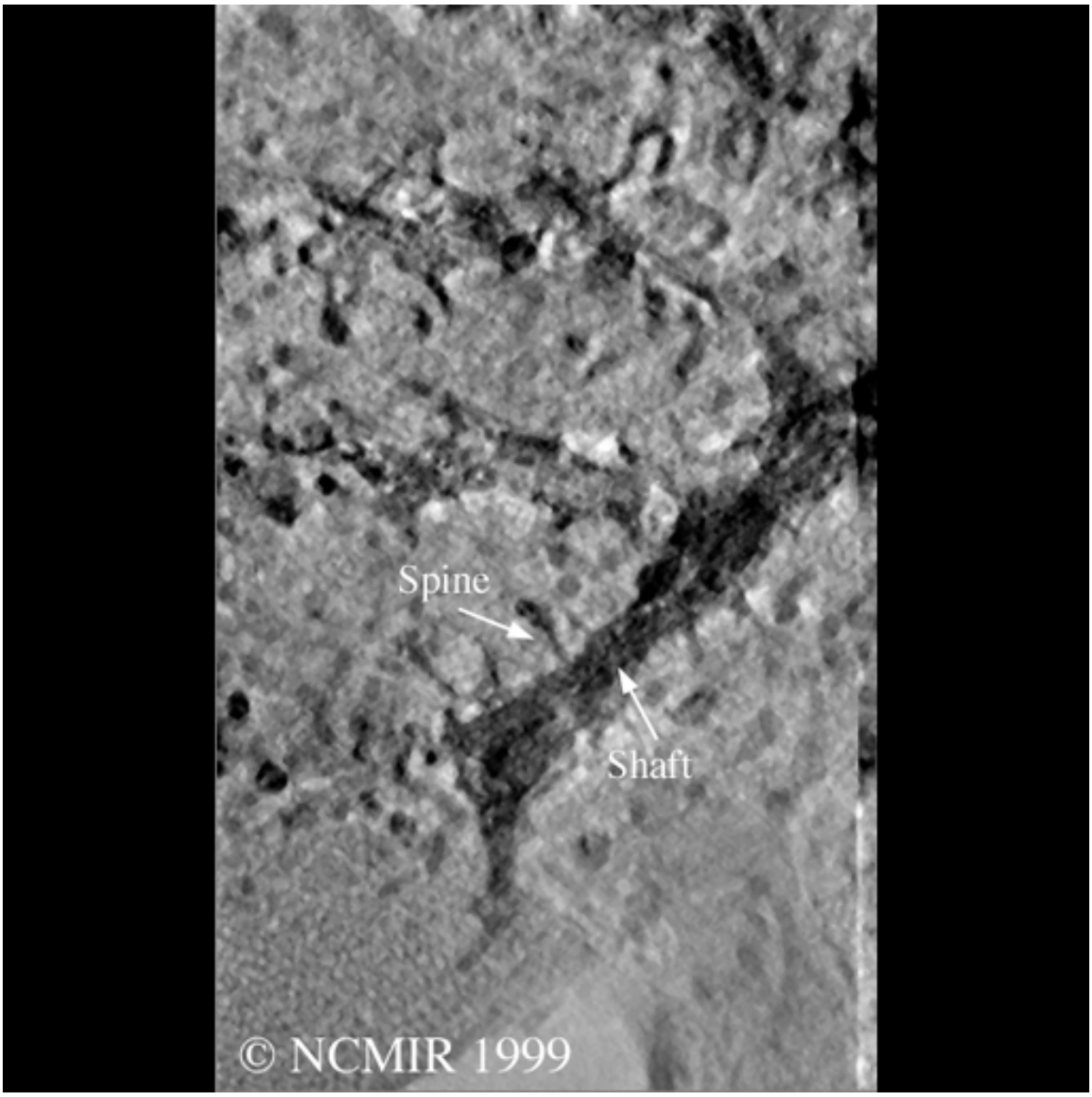
Image Type -	
SINGLE_TILT_IMAGE_SEQ_ID	5081
SINGLE_TILT_NOTES	Specimen was pre-irradiated prior to imaging
SINGLETILTIMAGESEQ_ID	5081
RANGE_MAX	60 degrees
RANGE_MIN	-60 degrees
SINGLE_NOTES	Specimen was pre-irradiated prior to imaging

Specimen Description -	
ANATOMICAL_DETAIL	5161
ATLAS_COORD	, ,
CELL_TYPE	Purkinje neuron
ORGAN	brain
REGION	cerebellum
STRUCTURE	spiny dendrite
SYSTEM	central nervous system

Electron Microscopy Product -	
EM_PRODUCT_ID	5162
ACCELERATING_VOLTAGE	3 MeV
EMBEDDING_MEDIUM	resin
MAGNIFICATION	4000
RECORDING_MEDIUM	film

Reconstruction

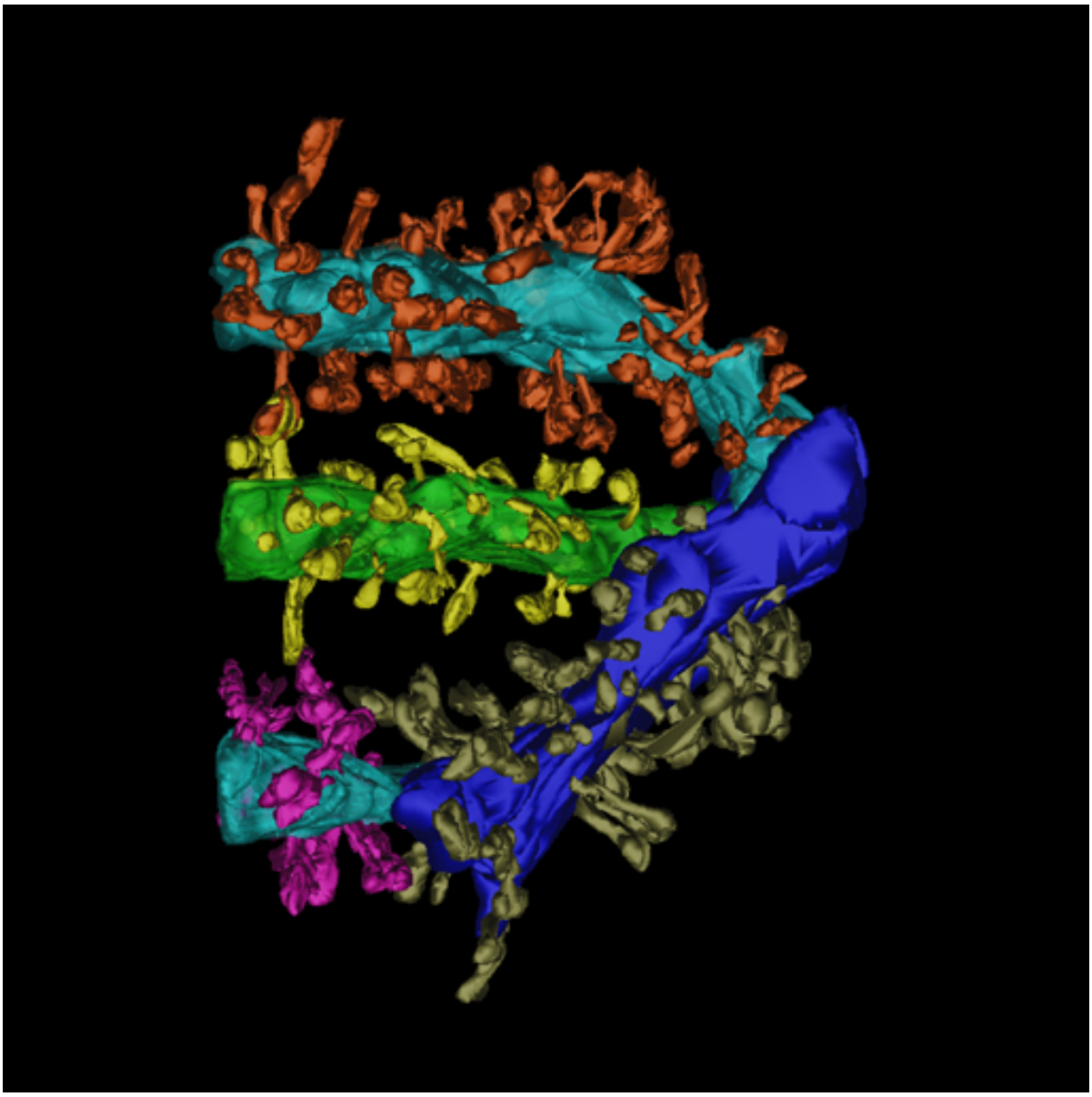
Reconstruction Image -



Reconstruction -	
RECONSTRUCTION3D_ID	5141
ALIGNMENT_METHOD	manual
ALIGNMENT_PROGRAM	xfido
CROPPING_COORDINATE1	,
CROPPING_COORDINATE2	,
RECON_ALGORITHM	R-weighted back projection
RECON_DESC	Zip file containing compressed volume in Analyze 7.5 format. File contains both .hdr and .img files.
RECON_PROGRAM	Suprim
RECON_TYPE	single tilt electron tomography
VOLUME_DIMENSION	390, 640, 220
VOLUME_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_vol.zip
VOXEL_SCALE	.021, .021, .021
RECONSTRUCTION_IMAGES_ID	5141
RECON_IMAGE_DESC	SIngle computed slice through tomographic volume of selectively stained Purkinje cell spiny dendrite from rat cerebellar cortex.
RECON_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_vol.jpg
VOLUME_THUMBNAIL	P1119/osaka1_vol_thmb.jpg
ANIMATION_FILE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_r.220.mov
ANIMATION_FILE_FORMAT	Quicktime
ANIMATION_DESC	Animation through computed slices of tomographic reconstruction of a selectively stained Purkinje cell spiny dendrite.

Segmentation

Segmentation Image -



Segmentation -	
SEGMENTED_OBJECT_ID	5207
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	0
OBJECT_DESC	dendritic spines on branch 1
OBJECT_NAME	sp1
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5207
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5204
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y

Segmentation -

LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	1
OBJECT_DESC	main dendritic shaft
OBJECT_NAME	shaft
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5204
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5200
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	1
OBJECT_DESC	dendritic shaft of one branch
OBJECT_NAME	branch1
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5200
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5202

Segmentation -	
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	1
OBJECT_DESC	dendritic shaft of one branch
OBJECT_NAME	branch3
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5202
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5205
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively

Segmentation -	
	stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	1
OBJECT_DESC	set of cross sections of the dendritic shaft used for measuring length
OBJECT_NAME	shaft.length
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5205
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5206
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	0
OBJECT_DESC	dendritic spines on main branch
OBJECT_NAME	sp
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5206
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5208
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was

Segmentation -	
	segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	0
OBJECT_DESC	dendritic spines on branch 2
OBJECT_NAME	spines2
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5208
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5209
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.

Segmentation -

NUMBER_OF_OBJECT	0
OBJECT_DESC	dendritic spines on branch 3
OBJECT_NAME	spines3
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5209
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5201
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	1
OBJECT_DESC	dendritic shaft of one branch
OBJECT_NAME	branch2
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5201
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg
SEGMENTED_OBJECT_ID	5203
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.

Segmentation -	
ANALYZE_DESC	Manual segmentation of spiny branchlets of a selectively stained Purkinje cell dendrite using Xvoxtrace 2.4. Each branch was segmented separately along with its complement of dendritic spines. Contours were surfaced using Synu.
DISPLAY_IMAGE_DESC	Surface rendering of a tomographic reconstruction of a Purkinje cell branched dendrite from a 4 um thick section. Each of the branches and their complement of spines were segmented separately.
DOWNLOADABLE_FILE_DESC	Zip file containing the original trace file (osaka1.r.trace), the surfaced objects (*.synu) and the Viewdata file required to view them using Synu.
IS_MANUAL	Y
LABELING_RANK	none
NOTES	Segmentation of the branches and dendritic spines of a selectively stained Purkinje cell dendrite reconstructed using electron tomography.
NUMBER_OF_OBJECT	0
OBJECT_DESC	unknown
OBJECT_NAME	saf
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1_seg.jpg
SEGMENTED_OBJECT_ID	5203
SEGMENT_PERSON_NAME	Naoko Yamada
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1119/Experiment_10/Subject_10/Tissue_113/Microscopy_3494/osaka1r_seg.zip
THUMBNAIL	P1119/osaka1_seg_thmb.jpg

USER AGREEMENT

Data Sharing and Citation Policy: The mission of the CCDB is to promote data sharing among scientists interested in cellular and subcellular anatomy and in developing computer algorithms for 3D reconstruction and modeling of such data. Data sets may be viewed or shared at the discretion of the author of the data. In some cases, the data may be freely viewed and downloaded without contacting the original author while in other cases, permission of the author may have to be obtained prior to downloading the data. In either case, failure to cite or give proper credit to the original authors who collected these data in subsequent published articles or presentations is a material breach of this User Agreement. CCDB requires all researchers re-analyzing these published data via the CCDB access to reference the original published article and the CCDB. An example of an appropriate acknowledgement is provided on the CCDB web site. CCDB is not in a position to police every intended use of these data. The scientific community will self-police the compliance of this contractual obligation.

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USER NOTIFICATION

For large size image data, it will take several minutes to download, please be patient. Thanks!

ACKNOWLEDGEMENT

Data used from the CCDB should be appropriately referenced, including both the author of the data and the CCDB. If the data were from a published study, the reference is included in the database record. The following reference should be cited for the CCDB:

Martone, M. E., Gupta, A., Wong, M., Qian, X., Sosinsky, G., Ludaescher, B., and Ellisman, M. H. A cell centered database for electron tomographic data. J. Struct. Biology 138: 145-155, 2002.

In addition, the support for the Cell Centered Database should be included in the acknolwedgement section of any publication:

The Cell Centered Database is supported by NIH grants from NCRR RR04050, RR RR08605 and the Human Brain Project DA016602 from the National Institute on Drug Abuse, the National Institute of Biomedical Imaging and Bioengineering and the National Institute of Mental Health, and NSF grants supporting the National Partnership for Advanced Computational Infrastructure NSF-ASC 97-5249 and MCB-9728338.

Maryann Martone