

NEUROXIV USER INSTRUCTION

neuroXiv

2022-05-31

v1.3

Select neurons of interest to analyze

User can select neurons from the list to analysis.

The screenshot displays the neuroXiv interface for neuron analysis. At the top, there are search and upload options. The main area is divided into a 'Neurons viewer' on the left and a 'Neurons analysis' section on the right. The 'Neurons analysis' section features an 'Arbor Distribution' scatter plot and a list of neuron reconstructions.

Neurons viewer (Left Panel):

- basic information:**
 - number of neurons: 5
 - IMOST registration: 5
 - dendrite reconstructions: 5
 - axon reconstructions: 5
 - number of neurons in AId: 4
 - number of neurons in MOp: 1
- morphology features:**
- anatomy/projection info:**

Arbor Distribution (Scatter Plot):

The scatter plot shows the relationship between 'Arbor length' (x-axis) and 'Distal arbor ratio' (y-axis). The x-axis ranges from 7500 to 30000, and the y-axis ranges from 0 to 1. The plot includes a legend for 'Arbor length' (7500, 15000, 22500, 30000) and 'Distal arbor ratio' (0, 0.25, 0.5, 0.75, 1). The plot shows several data points, with a notable cluster of points at high arbor length and high distal arbor ratio.

Neuron Reconstructions (Right Panel):

The right panel displays a list of neuron reconstructions. Each reconstruction is shown with a small image and a set of controls. The controls include a checkbox, a 'Select All' button, and a 'View' button. Below the image, there are labels for 'Ald', 'IMOST', 'axon', 'bouton', 'dendrite', and 'soma'. The 'Info' button is also present.

Analysis Results (Bottom):

Four bar charts are displayed, showing the results of the analysis for selected neurons:

- dendrite_center shift:** Values range from 27.45 to 35.49.
- dendrite_relative center shift:** Values range from 0.32 to 0.39.
- dendrite_average contraction:** Values range from 0.4 to 0.4.
- dendrite_average bifurcation angle remote:** Values range from 0.4 to 0.4.

Annotations on the image:

- 1. Check the neurons of interest. Can select across pages:** An arrow points to the checkboxes in the neuron reconstruction list.
- 2. Click analysis to see the result.:** An arrow points to the 'Analysis' button in the top right corner.

View information and visualization of a neuron

In the neuron list, users can see basic information of each neuron. Detailed information and 3D visualization of each neuron can be viewed by clicking info button in the list.

The screenshot displays the NeuroXiv web application interface. At the top, there is a navigation bar with the 'neuroxiv' logo, search options, and institutional affiliations (Tencent AI Lab and Southeast University). The main content area is divided into three sections:

- Left Panel (Neurons viewer):** Contains a sidebar with an 'info' button circled in red. Below it, a 'viewer property' section is visible. A large grey box with white text reads: "Feature table of the neuron viewed".
- Center Panel (Neurons analysis):** Features a 3D visualization of a neuron within a brain model. A grey box with white text reads: "Neuron data 3D visualization". A callout box with white text on a dark background says: "Click on the view button and jump to the neuron info bar".
- Right Panel (Neuron list):** Shows a list of neurons. Each entry includes a small 3D thumbnail, a table of attributes (Aid, MOST, axon, bouton, dendrite, soma), and an 'Info' button. A grey box with white text reads: "List of neurons to be viewed".

At the bottom of the right panel, there is a pagination control showing page 1 of 1381.

NEUROXIV USER INSTRUCTION

User can control the 3D display of the brain regions, neurons, as well as the slices of the brain in the left column.

User also can rotate, scale, and pan the objects freely in the middle region (control object rotation with the left mouse key, use the right mouse key for object translation, and zoom with the mouse wheel).

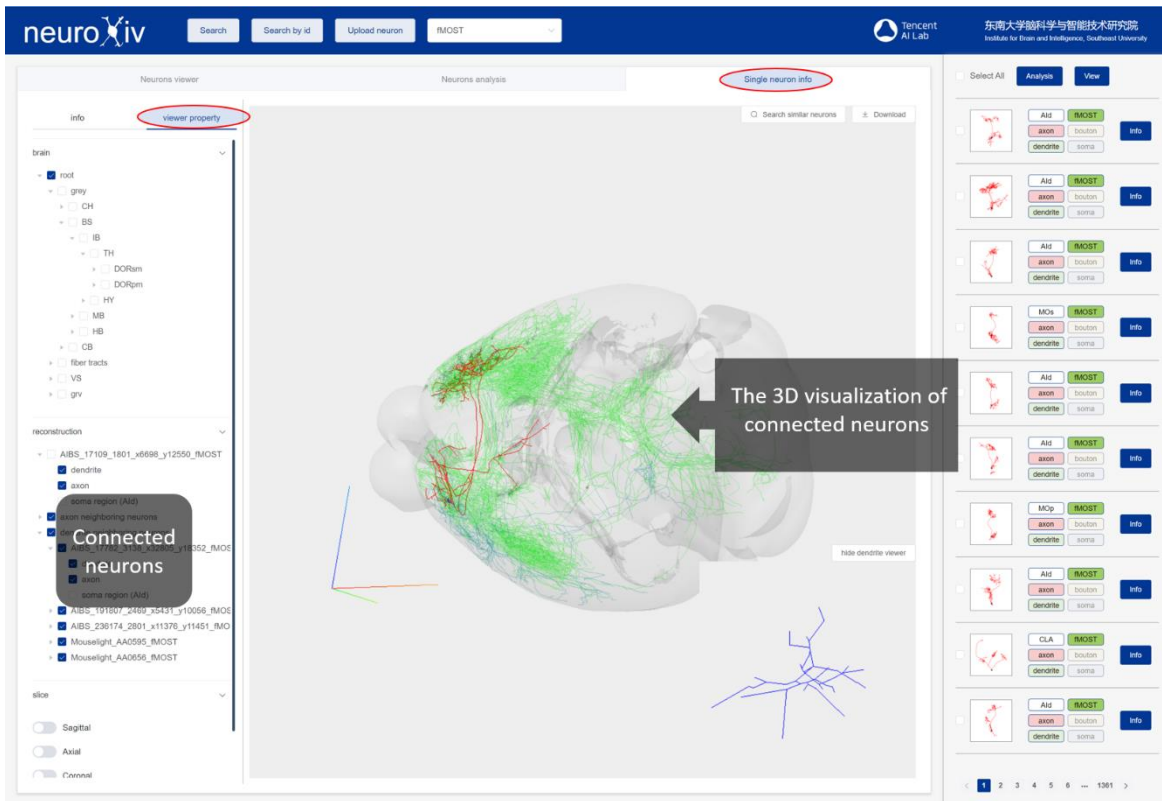
In the lower right corner, user can rotate, scale, and pan the dendrite of neuron.

The screenshot displays the NeuroXiv web application interface. The top navigation bar includes the 'neuroXiv' logo, search options, and user information. The main content area is divided into three sections: a left sidebar, a central 3D viewer, and a right sidebar.

- Left Sidebar:** Contains 'info' (with a circled 'viewer property'), 'brain' (with a 'Brain region' annotation), 'reconstruction' (with a 'Neuron reconstruction (dendrite and axon)' annotation), 'slice' (with a 'Brain slice' annotation), and 'roi'.
- Central 3D Viewer:** Shows a 3D brain model with a neuron reconstruction (red) and a brain slice (black). Annotations include 'Neuron reconstruction (dendrite and axon)', 'Brain slice', 'Brain region', and 'dendrite' (with a 'dendrite' annotation).
- Right Sidebar:** Features a 'Single neuron info' button (circled), a 'Download the neuron info' button, and a list of neurons with their respective components (axon, bouton, dendrite, soma) and an 'Info' button for each.

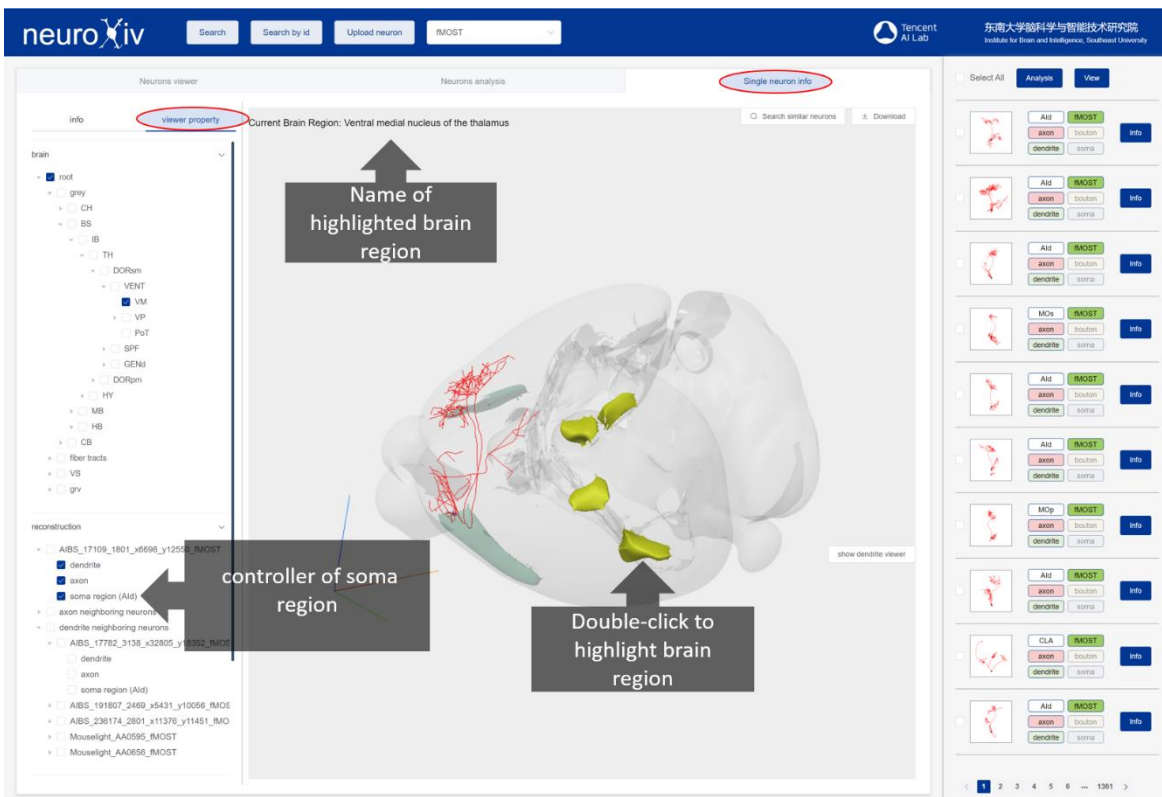
NEUROXIV USER INSTRUCTION

User can observe the 3D visualization of the neurons connected to the viewed neuron.



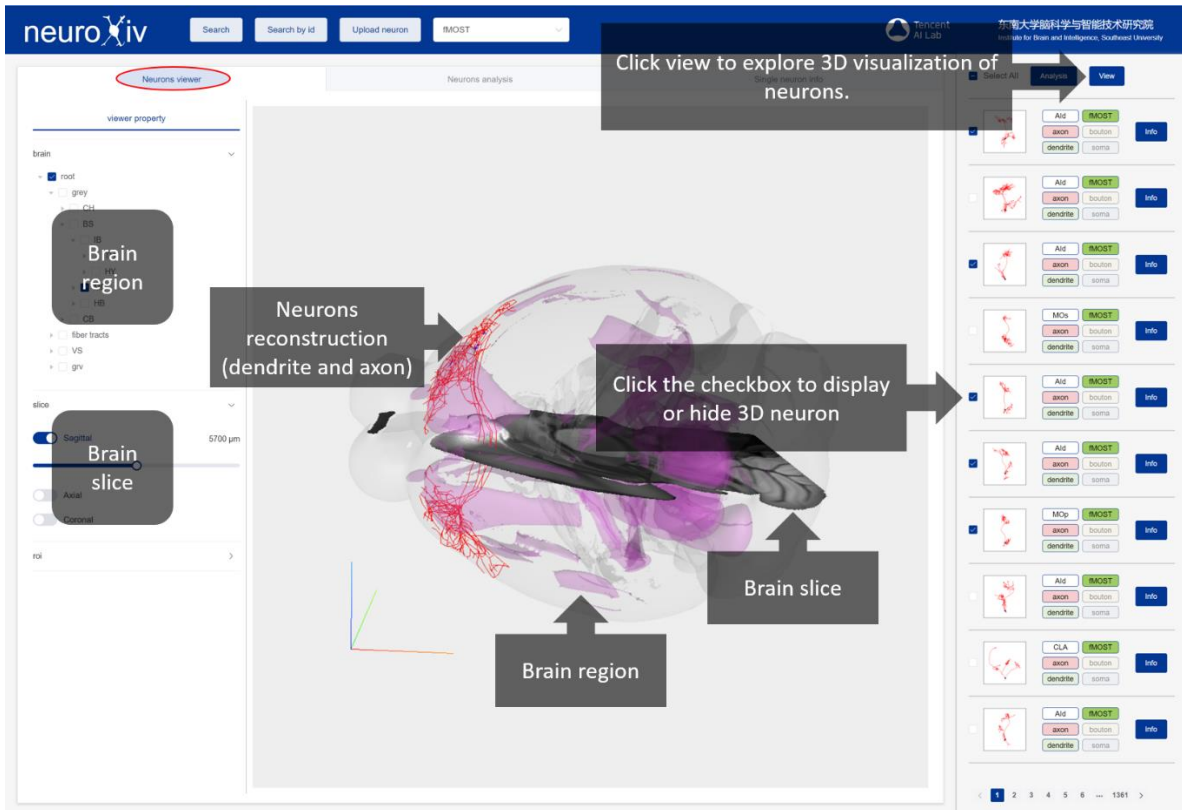
User can control the 3D visualization of soma region.

User can double-click the left mouse button to highlight a brain region.

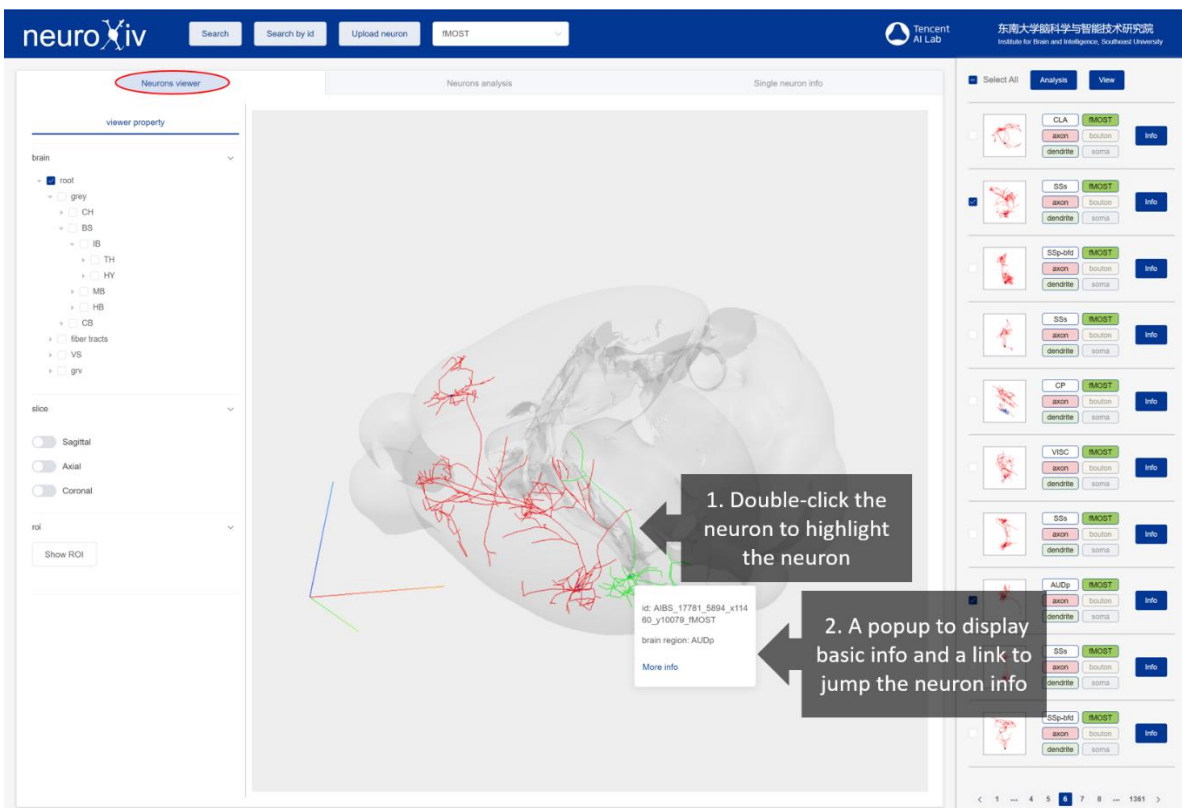


Select neurons of interest to explore 3D visualization

User can select neurons from the list to view the 3D visualization



User can select a single neuron from 3D viewer to see the info



Search neurons of interest

Click “search” button on the top to open search panel. User can search for neuron that meet the criteria they set.

The screenshot shows the NeuroXiv search panel with the following annotations:

- 1. Find the criteria in the tree menu**: Points to the 'Menu' on the left side of the search panel.
- 2. Click add button**: Points to the 'Add' button next to a criterion in the search list.
- 3. Added criteria will appear here**: Points to the search list where criteria are added.
- 4. Edit values here**: Points to a search criteria configuration window where values can be edited.
- 5. Click confirm to search neurons of interest**: Points to the 'Confirm' button at the bottom right of the search panel.

Additional annotations include:

- Optional search criteria to be added**: Points to a list of optional criteria in the menu.
- Search criteria added**: Points to a criterion in the search list.
- Click delete to remove the criteria**: Points to the 'Delete' button for a criterion.
- Reset the search criteria**: Points to the 'Reset' button at the bottom.

For categorical criteria like brain region, user needs to select from a given list of options.

The screenshot shows a modal window titled 'Select brain region' with the following annotations:

- 1. Check the values to be added.**: Points to the 'Candidates' list in the modal.
- 2. Click arrow to remove/add options**: Points to the left and right arrow buttons in the modal.
- 3. Click confirm to finish**: Points to the 'Confirm' button at the bottom of the modal.

Additional annotations include:

- Option candidates**: Points to the 'Candidates' list.
- Selected options to be searched**: Points to the 'Selected' list in the modal.

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User can save and load their own search criteria.

The screenshot shows the 'Neuron Search' interface. On the right, there are buttons for 'Load Search Config' and 'Save Search Config'. A callout box with an arrow points to the 'Save Search Config' button, containing the text: "1. Click the button to save search config". In the center, a dialog box titled "Please input your search configure name:" is open, with a text input field containing "test_100" and "OK" and "Cancel" buttons. A callout box with an arrow points to the "OK" button, containing the text: "2. Edit the name of search config and click ok".

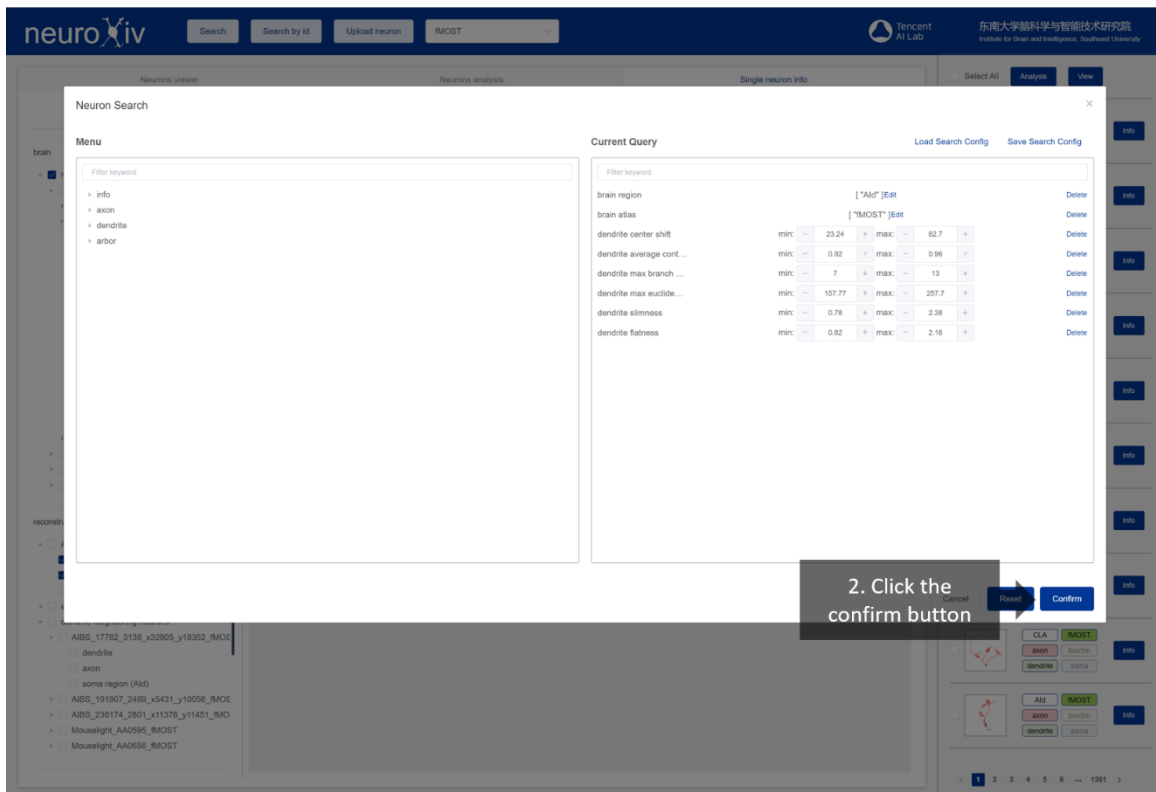
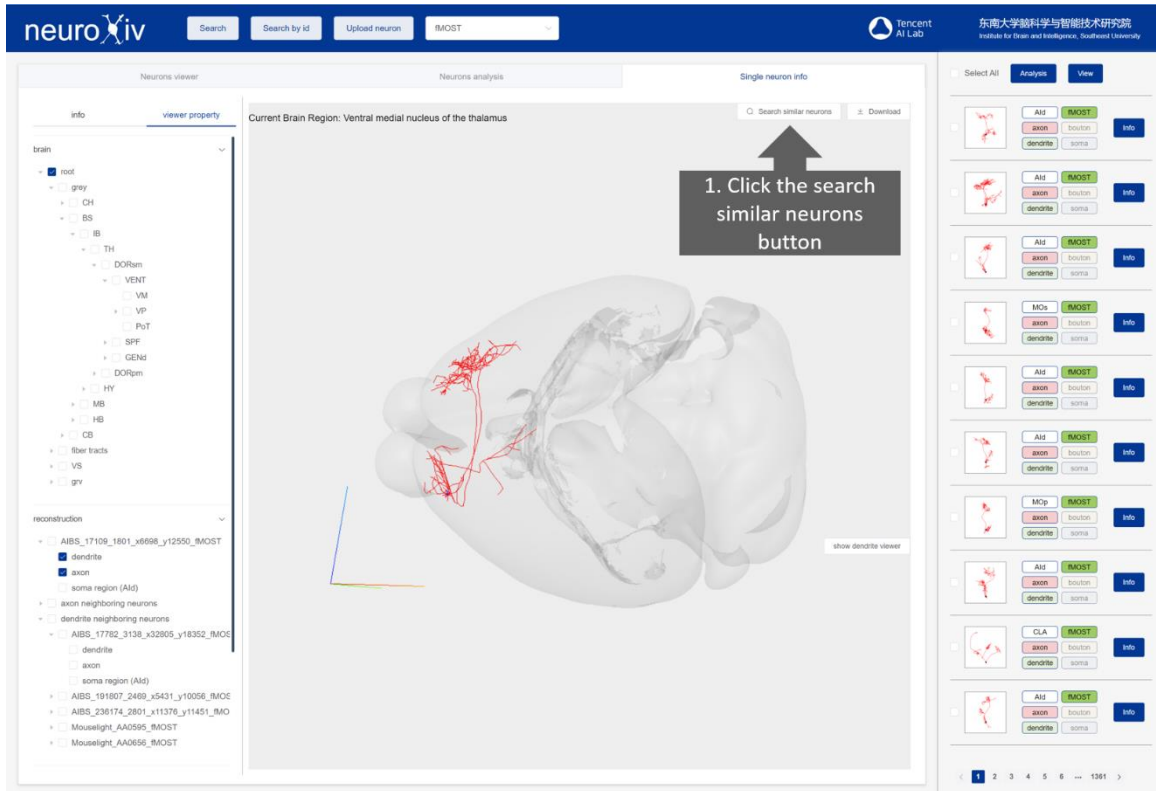
The screenshot shows the 'Load Search Config' dialog box. It contains a table with the following data:

| Time | Search config name | Action |
|---------------------------|--------------------|---------------|
| 2022-04-29T11:15:42+08:00 | test_100 | Select Delete |

Callout boxes provide instructions: "3. Click the button to load search config" points to the 'Load Search Config' button; "4. select the search config" points to the 'Select' button in the table; and "Delete the search config" points to the 'Delete' button in the table.

Search similar neurons

Click “search similar neurons” button in the single neuron info bar to open search panel. User can search similar neurons of the viewed neuron.



Search neuron by id

Click “search by id” button on the top to open search panel. User can search for a neuron based the neuron id and jump to single neuron info bar.

The screenshot shows the neuroXiv interface with a search dialog box overlaid on the neuron visualization. The dialog box contains the text "Please input a neuron id" and a text input field. Below the input field are "Cancel" and "Confirm" buttons. An arrow points from the text "Input the part of neuron id and click confirm to search" to the dialog box. The background shows a 3D brain model with a neuron highlighted in red. The interface includes a top navigation bar with "Search", "Search by id", "Upload neuron", and "RMOST" buttons. The left sidebar shows "Neurons viewer" with "info" and "viewer property" tabs. The right sidebar shows "Single neuron info" with a "Search similar neurons" button and a "Download" button. The main content area displays "Current Brain Region: Ventral medial nucleus of the thalamus".

The screenshot shows the neuroXiv interface with the "Single neuron info" panel selected. The neuron ID "Mouselight_AA0001_RMOST" is circled in red in the "basic information" section. The interface shows the neuron's morphology and various metrics. The top navigation bar includes "Search", "Search by id", "Upload neuron", and "RMOST" buttons. The left sidebar shows "Neurons viewer" with "info" and "viewer property" tabs. The right sidebar shows "Single neuron info" with a "Search similar neurons" button and a "Download" button. The main content area displays "Current Brain Region: Ventral medial nucleus of the thalamus".

| metric | value |
|--------------------------------------|-----------------------|
| center shift | 1974.95 μm |
| relative center shift | 0.83 |
| average contraction | 0.94 |
| average bifurcation an gle remote | 66.53 $^{\circ}$ |
| average bifurcation an gle local | 73.55 $^{\circ}$ |
| max branch order | 28 |
| number of bifurcations | 332 |
| total length | 90929.9 μm |
| max euclidean distanc e | 6571.01 μm |
| max path distance | 9162.73 μm |
| average euclidean dist ance | 2368 μm |

Search neurons based ROI

Click "Show ROI" button of "roi" in the Neurons Viewer bar or Single neuron info bar. User can search neurons based ROI.

The screenshot displays the neuroXiv web application interface. At the top, there is a navigation bar with the 'neuroXiv' logo, search options, and institutional affiliations (Tencent AI Lab and Southeast University). The main content area is divided into three tabs: 'Neurons viewer', 'Neurons analysis', and 'Single neuron info'. The 'Neurons viewer' tab is active, showing a 3D visualization of a brain with red neuron reconstructions. On the left side, there is a 'viewer property' panel with sections for 'info', 'brain', 'reconstruction', 'slice', and 'roi'. The 'roi' section contains a 'Show ROI' button, which is highlighted by a grey callout box with the text '1. Click Show ROI'. On the right side, there is a 'Single neuron info' panel with a list of neurons, each with a small thumbnail and a set of buttons for 'Aid', 'MOST', 'axon', 'boulon', 'dendrite', and 'soma'. A pagination bar at the bottom indicates 1361 items.

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neuroxiv Search Search by id Upload neuron IMOST Tencent AI Lab 东南大学脑科学与智能技术研究院 Institute for Brain and Intelligence, Southeast University

Neurons viewer Neurons analysis Single neuron info

viewer property

Hide ROI

r (μm) 500
x (μm) 6685
y (μm) 3741
z (μm) 5000

Update Search Neurons Inside

double left-click in 3D view to hide ROI

Click this to hide ROI

A ball representing the ROI

2. Double-click the left-key of mouse on the ROI

Click "Update" to set position and radius of ROI

Select All Analysis View

Aid IMOST
axon bouton
dendrite soma info

1 2 3 4 5 6 ... 1361

neuroxiv Search Search by id Upload neuron IMOST Tencent AI Lab 东南大学脑科学与智能技术研究院 Institute for Brain and Intelligence, Southeast University

Neurons viewer Neurons analysis Single neuron info

info viewer property

brain
reconstruction
slice
roi

Hide ROI

r (μm) 500
x (μm) 4088
y (μm) 3871
z (μm) 2905

Update Search Neurons Inside

double left-click in 3D view to hide ROI

The position of the ROI

3. Set and update the radius of ROI

4. Click "Search Neurons Inside" to search data

The result will show in here

The ball will move to the ROI

Select All Analysis View

Aid IMOST
axon bouton
dendrite soma info

MOp IMOST
axon bouton
dendrite soma info

Aid IMOST
axon bouton
dendrite soma info

CP IMOST
axon bouton
dendrite soma info

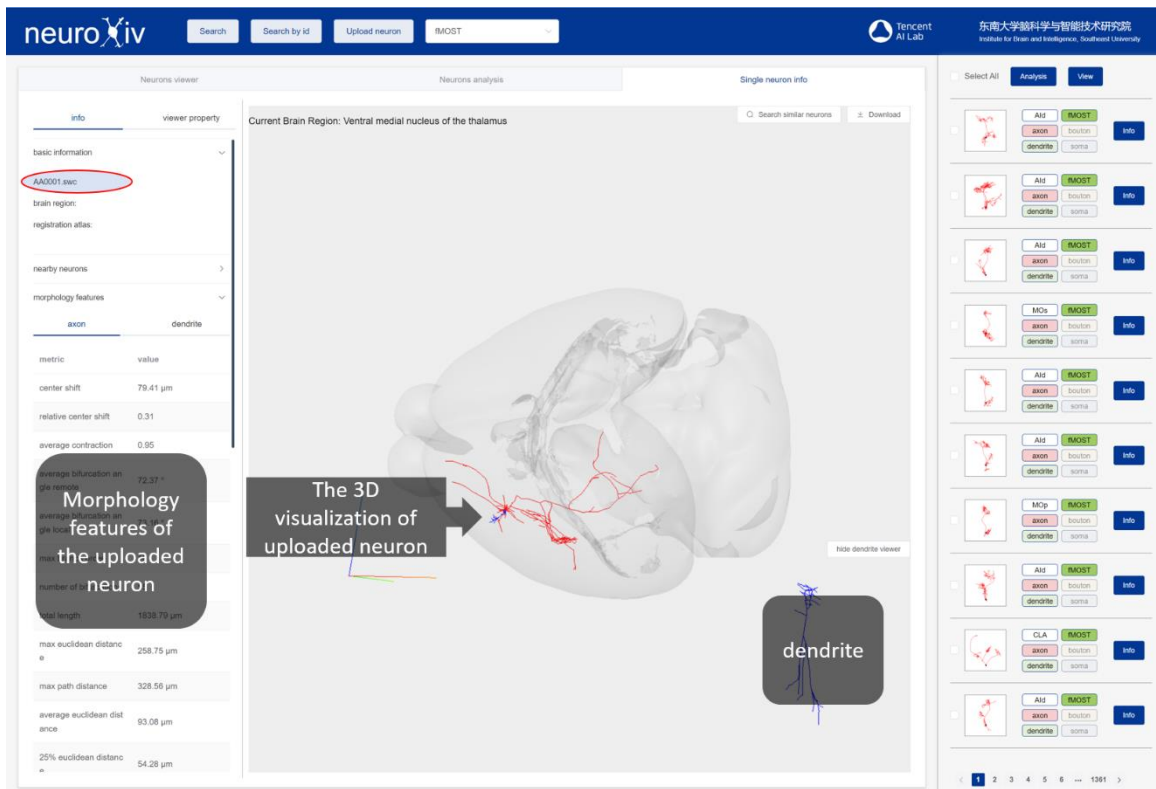
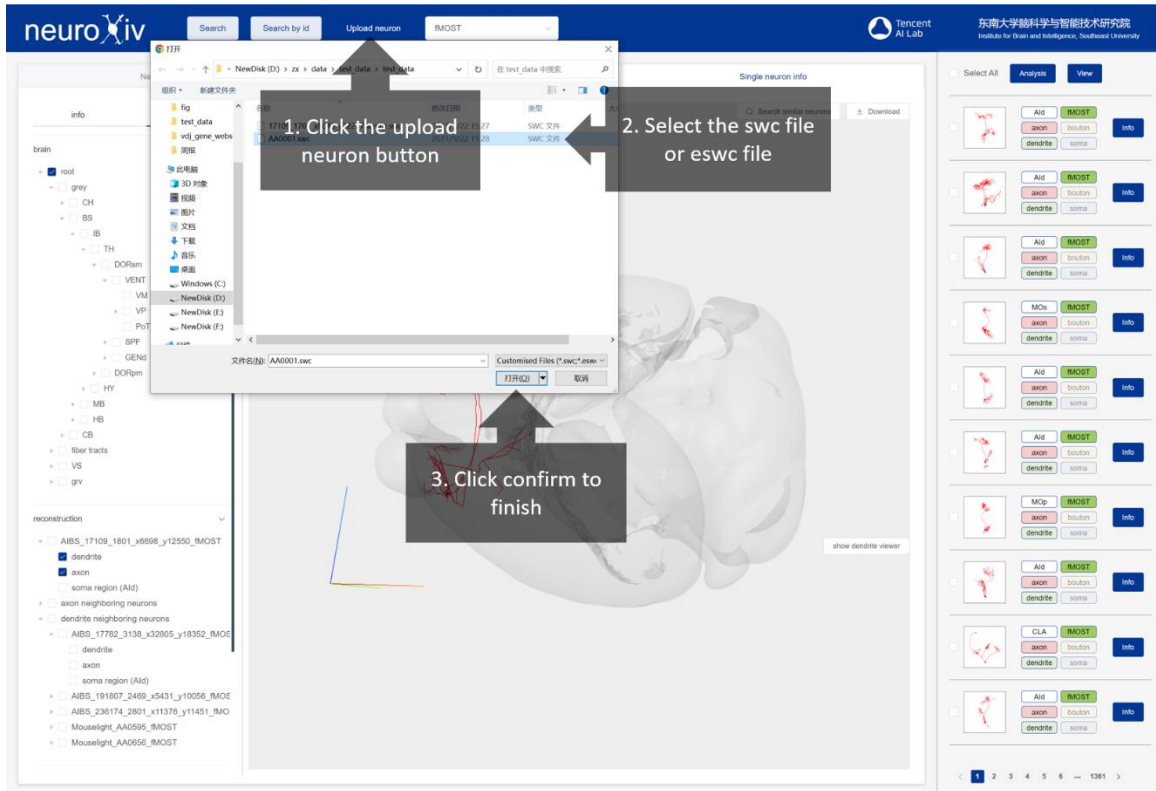
Aid IMOST
axon bouton
dendrite soma info

CP IMOST
axon bouton
dendrite soma info

1 2 3 4 5 6 7

Upload neuron

Click “upload” button on the top to open search panel. User can calculate the morphology features and explore the 3D visualization of uploaded neuron.



Explore the cross species atlas

Click brain region of neuron in neuron list to jump cross species atlas web page.

Click the number of neuron collections to jump neuron web page.

Click the middle part of the brain region or the left brain region tree structure to display the information of the brain region.

The screenshot displays the NeuroXiv web interface. At the top, the logo "neuroxiv" is on the left, and the Tencent AI Lab logo and "东南大学脑科学与智能技术研究院" (Institute for Brain and Intelligence, Southeast University) are on the right. The interface is divided into several sections:

- Left Panel (Menu):** A tree structure for brain regions. The "Aid" region is selected and highlighted in blue. Other regions listed include root, grey, CH, CTX, CTXpl, Isocortex, FRP, MO, SS, GU, VISC, AUD, VIS, ACA, PL, ILA, DRB, AI, Alp, Alv, RSP, PTLp, TEa, PERI, ECT, OLF, HPF, CTXsp, CNU, BS, CB, fiber tracts, VS, grv, and retina.
- Top Center (Filters):** "Species" is set to "Adult Mouse" and "Template" is set to "template".
- Top Right (Metadata):**
 - species: Adult Mouse
 - atlas: CCFv3
 - brain region: Agranular insular area, dorsal part(Aid)
 - neuron collections: 412
 - adjacent brain regions:
 - related brain regions:
- Center (Main View):** A 3D rendering of a mouse brain in coronal section, with the "Aid" region highlighted in blue.
- Right Panel (Thumbnail Gallery):** A vertical stack of 10 brain slice thumbnails. The 4th thumbnail from the top is highlighted with a blue border, indicating the current slice view.
- Bottom Right (Navigation):** A set of navigation controls including arrows and a page number "4" out of "17".

NEUROXIV USER INSTRUCTION

The screenshot displays the neuroXiv web application interface. At the top left is the 'neuroXiv' logo. At the top right are the logos for 'Tencent AI Lab' and '东南大学脑科学与智能技术研究院' (Institute for Brain and Intelligence, Southeast University). The main interface is divided into several sections:

- Left Panel (Menu):** Contains a 'Species' dropdown set to 'Adult Mouse' and a 'Template' dropdown set to 'template'. Below is a 'Filter keyword' input field and a hierarchical tree view of brain regions. The 'MEA' (Medial Amygdaloid Nucleus) region is highlighted in blue.
- Center Panel:** Shows a 3D brain model with the MEA region highlighted in blue. Two informational popups are overlaid on the model. The left popup lists details for the MEA, including species, atlas, brain region, neuron collections, adjacent brain regions, related brain regions, and a tree shrew reference. The right popup lists details for the BMA (Basomedial Amygdalar Nucleus), including species, atlas, brain region, neuron collections, adjacent brain regions, related brain regions, and a tree shrew reference.
- Right Panel:** A vertical stack of eight coronal brain slices, with the slice corresponding to the MEA region highlighted in blue. A navigation bar at the bottom of this panel shows page numbers 1 through 11, with 8 being the active page.

Instructional callouts are present:

- A grey box with the text '1. Click brain region to popup info' has an arrow pointing to the blue MEA region in the 3D model.
- A grey box with the text 'Click blue text to jump this brain region' has an arrow pointing to the blue text 'Medial amygdaloid nucleus(MEA)' in the left popup.
- A grey box with the text 'Mouseover blue text to popup other info' has an arrow pointing to the blue text 'Basomedial amygdalar nucleus(BMA)' in the right popup.