

# Package: ciftier (via r-universe)

May 29, 2026

**Type** Package

**Title** Read and Write CIFTI-2 Neuroimaging Files

**Version** 0.1.0

**Description** Pure R implementation of CIFTI-2 format I/O for grayordinate neuroimaging data. Reads and writes dense timeseries (.dtseries.nii), dense scalars (.dscalar.nii), and dense labels (.dlabel.nii) files without requiring external tools such as Connectome Workbench. Provides S4 classes mirroring the CIFTI-2 XML schema, user-friendly axis abstractions, and optional integration with 'neuroim2' and 'neurosurf' for spatially-aware brain imaging objects.

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 4.1.0)

**Imports** methods, xml2, RNifti

**Suggests** Matrix, neuroim2, neurosurf, testthat (>= 3.0.0), knitr, rmarkdown

**Collate** 'constants.R' 'all\_generic.R' 'all\_class.R' 'utils.R'  
'cifti\_xml.R' 'cifti\_axis.R' 'cifti\_axis\_methods.R'  
'cifti\_image.R' 'cifti\_io.R' 'cifti\_intent.R' 'integration.R'  
'zzz.R'

**RoxygenNote** 7.3.3

**Config/testthat/edition** 3

**URL** <https://github.com/bbuchsbaum/ciftier>

**BugReports** <https://github.com/bbuchsbaum/ciftier/issues>

**Config/pak/sysreqs** libxml2-dev

**Repository** <https://bbuchsbaum.r-universe.dev>

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**RemoteRef HEAD****RemoteSha** dc2f46b92576f92adceca141f450f958d87c95f1**Contents**

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---

as\_bilat\_surface\_vector

*Extract Bilateral Surface Data as a neurosurf Object*

---

**Description**

Extracts left and right cortex data and combines them into a `neurosurf::BilatNeuroSurfaceVector`.

**Usage**

```
as_bilat_surface_vector(x, left_geometry, right_geometry)
```

**Arguments**

`x` A `CiftiImage` with loaded data.  
`left_geometry` A `neurosurf::SurfaceGeometry` for the left hemisphere.  
`right_geometry` A `neurosurf::SurfaceGeometry` for the right hemisphere.

**Value**

A `BilatNeuroSurfaceVector`.

---

as\_neuro\_surface      *Extract Surface Data as a neurosurf Object*

---

### Description

Extracts data for a cortical surface structure from a [CiftiImage](#) and returns it as a neurosurf object.

### Usage

```
as_neuro_surface(x, structure, geometry)
```

### Arguments

x	A <a href="#">CiftiImage</a> with loaded data.
structure	Character string naming the surface structure (e.g., "cortex_left", "cortex_right").
geometry	A neurosurf::SurfaceGeometry object providing the mesh for this hemisphere. Required.

### Details

For a single-map image, returns a neurosurf::NeuroSurface. For multi-map or time series data, returns a neurosurf::NeuroSurfaceVector.

### Value

A NeuroSurface (single map) or NeuroSurfaceVector (multiple maps / time series).

---

as\_neuro\_vec      *Extract All Subcortical Volume Data as a neuroim2 Object*

---

### Description

Combines all volume-based brain structures into a single SparseNeuroVol or SparseNeuroVec.

### Usage

```
as_neuro_vec(x)
```

### Arguments

x	A <a href="#">CiftiImage</a> with loaded data.
---	--

### Value

A SparseNeuroVol (single map) or SparseNeuroVec (multiple maps / time series).

---

as_neuro_vol	<i>Extract Volume Data as a neuroim2 Object</i>
--------------	---

---

**Description**

Extracts data for a subcortical (volume-based) brain structure from a [CiftiImage](#) and returns it as a neuroim2 sparse volume.

**Usage**

```
as_neuro_vol(x, structure)
```

**Arguments**

x	A <a href="#">CiftiImage</a> with loaded data.
structure	Character string naming the subcortical structure (e.g., "thalamus_left", "CIFTI_STRUCTURE_PUTAMEN").

**Details**

For a single-map image (e.g., one scalar map), returns a `neuroim2::SparseNeuroVol`. For multi-map or time series data, returns a `neuroim2::SparseNeuroVec`.

**Value**

A `SparseNeuroVol` (single map) or `SparseNeuroVec` (multiple maps / time series).

---

axes_to_header	<i>Convert Axis Objects Back to CiftiHeader</i>
----------------	---

---

**Description**

Convert Axis Objects Back to CiftiHeader

**Usage**

```
axes_to_header(row_axis, col_axis, version = "2")
```

**Arguments**

row_axis	A <a href="#">CiftiAxis</a> for rows (dimension 0).
col_axis	A <a href="#">CiftiAxis</a> for columns (dimension 1).
version	Character version string (default "2").

**Value**

A [CiftiHeader](#) object.

---

brain\_model\_from\_mask *Create a BrainModelAxis from a Mask*

---

### Description

Create a BrainModelAxis from a Mask

### Usage

```
brain_model_from_mask(mask, name, affine = NULL)
```

### Arguments

mask	For surfaces: a logical vector (length = nvertex). For volumes: a 3D logical array.
name	Canonical CIFTI structure string.
affine	4x4 affine matrix (required for volume masks).

### Value

A [BrainModelAxis](#) object.

---

brain\_model\_from\_surface  
*Create a BrainModelAxis from Surface Vertex Indices*

---

### Description

Create a BrainModelAxis from Surface Vertex Indices

### Usage

```
brain_model_from_surface(vertices, nvertex, name)
```

### Arguments

vertices	Integer vector of 0-based vertex indices.
nvertex	Total number of vertices on the surface.
name	Canonical CIFTI structure string.

### Value

A [BrainModelAxis](#) object.

---

brain_models	<i>Get Brain Models from an Object</i>
--------------	--

---

**Description**

Get Brain Models from an Object

**Usage**

```
brain_models(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A list of [CiftiBrainModel](#) objects.

---

BrainModelAxis-class	<i>BrainModelAxis Class</i>
----------------------	-----------------------------

---

**Description**

Describes a BRAIN\_MODELS dimension — each row/col maps to a surface vertex or volume voxel.

**Usage**

```
## S4 method for signature 'BrainModelAxis'
show(object)

## S4 method for signature 'BrainModelAxis'
length(x)

## S4 method for signature 'BrainModelAxis,numeric,missing'
x[i, j, ..., drop = TRUE]

## S4 method for signature 'BrainModelAxis,logical,missing'
x[i, j, ..., drop = TRUE]

## S4 method for signature 'BrainModelAxis'
c(x, ...)
```

```
## S4 method for signature 'BrainModelAxis,BrainModelAxis'
e1 == e2

## S4 method for signature 'BrainModelAxis'
iter_structures(x, ...)
```

### Arguments

object	A BrainModelAxis object.
x	A BrainModelAxis object.
i	Numeric or logical index vector.
j	Not used.
...	Additional arguments (ignored).
drop	Logical (ignored).
e1	First BrainModelAxis.
e2	Second BrainModelAxis.

### Slots

name Character vector of structure names (one per grayordinate).  
vertex Integer vector of 0-based vertex indices (NA for voxel entries).  
voxel Integer matrix (N x 3) of 0-based IJK indices (NA rows for surface entries).  
surface\_mask Logical vector: TRUE for surface entries, FALSE for volume.  
nvertices Named list mapping structure names to total vertex counts.  
affine 4x4 numeric matrix (volume affine) or NULL.  
volume\_shape Integer vector of length 3 or NULL.

---

build_cifti_xml	<i>Build CIFTI-2 XML from Header</i>
-----------------	--------------------------------------

---

### Description

Converts a [CiftiHeader](#) to an XML character string.

### Usage

```
build_cifti_xml(header)
```

### Arguments

header	A <a href="#">CiftiHeader</a> object.
--------	---------------------------------------

### Value

A character string containing the CIFTI-2 XML.

---

cifti_data	<i>Get the Data Matrix</i>
------------	----------------------------

---

**Description**

Get the Data Matrix

**Usage**

```
cifti_data(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A numeric matrix.

---

cifti_from_data	<i>Build a CiftiImage from Spatial Data Objects</i>
-----------------	---

---

**Description**

Constructs a CiftiImage from neuroim2 volume objects and/or neurosurf surface objects.

**Usage**

```
cifti_from_data(
  surfaces = list(),
  volumes = list(),
  row_axis = NULL,
  intent = 3002L
)
```

**Arguments**

surfaces	A named list of neurosurf objects, where names are CIFTI structure identifiers (e.g., "cortex_left", "cortex_right"). Each element should be a NeuroSurface or NeuroSurfaceVector.
volumes	A named list of neuroim2 volume objects, where names are CIFTI structure identifiers (e.g., "thalamus_left"). Each element should be a SparseNeuroVol or SparseNeuroVec.
row_axis	A <a href="#">CiftiAxis</a> for the row dimension (e.g., a SeriesAxis for time series data). If NULL, a default SeriesAxis is created.
intent	Integer NIFTI intent code (default: 3002 for dtseries).

**Value**

A [CiftiImage](#).

---

cifti_header	<i>Get the CIFTI Header</i>
--------------	-----------------------------

---

**Description**

Get the CIFTI Header

**Usage**

```
cifti_header(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A [CiftiHeader](#) object.

---

CIFTI_INDEX_TYPES	<i>CIFTI-2 Index Types</i>
-------------------	----------------------------

---

**Description**

Identifies what kind of data a dimension contains.

**Usage**

```
CIFTI_INDEX_TYPES
```

**Format**

An object of class character of length 5.

---

cifti_intent	<i>Get the NIfTI Intent Code</i>
--------------	----------------------------------

---

**Description**

Get the NIfTI Intent Code

**Usage**

```
cifti_intent(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

An integer intent code.

---

CIFTI_INTENTS	<i>CIFTI-2 NIfTI Intent Codes</i>
---------------	-----------------------------------

---

**Description**

NIfTI intent codes used by CIFTI-2 files.

**Usage**

```
CIFTI_INTENTS
```

**Format**

An object of class integer of length 11.

---

CIFTI\_MODEL\_TYPES      *CIFTI-2 Brain Model Types*

---

**Description**

CIFTI-2 Brain Model Types

**Usage**

CIFTI\_MODEL\_TYPES

**Format**

An object of class character of length 2.

---

CIFTI\_SERIES\_UNITS      *CIFTI-2 Series Unit Types*

---

**Description**

CIFTI-2 Series Unit Types

**Usage**

CIFTI\_SERIES\_UNITS

**Format**

An object of class character of length 4.

---

CIFTI\_STRUCTURES      *CIFTI-2 Brain Structure Names*

---

**Description**

Named character vector of valid CIFTI-2 brain structure identifiers. Names are short aliases; values are the full CIFTI XML strings.

**Usage**

CIFTI\_STRUCTURES

**Format**

An object of class character of length 33.

---

CiftiAxis-class      *CiftiAxis Virtual Base Class*

---

**Description**

All CIFTI axis types inherit from this virtual class.

---

CiftiBrainModel-class      *CiftiBrainModel Class*

---

**Description**

Describes one brain structure's mapping in a BrainModels index map. Indices stored here follow CIFTI conventions (0-based).

**Slots**

index\_offset Integer offset into the matrix dimension.  
 index\_count Integer number of indices for this model.  
 model\_type Character: "CIFTI\_MODEL\_TYPE\_SURFACE" or "CIFTI\_MODEL\_TYPE\_VOXELS".  
 brain\_structure Character: canonical CIFTI structure string.  
 surface\_number\_of\_vertices Integer: total vertices on the surface (0 for voxel models).  
 vertex\_indices Integer vector of 0-based vertex indices (surface models).  
 voxel\_indices\_ijk Integer matrix (N x 3) of 0-based IJK voxel indices (voxel models).

---

CiftiHeader-class      *CiftiHeader Class*

---

**Description**

Top-level parsed CIFTI-2 XML header.

**Slots**

version Character string (e.g., "2").  
 matrix A [CiftiMatrix](#) object.

---

CiftiImage

*Create a CiftiImage*


---

### Description

Create a CiftiImage

### Usage

```
CiftiImage(
  data = NULL,
  header = NULL,
  row_axis = NULL,
  col_axis = NULL,
  intent = 0L,
  file_name = ""
)
```

### Arguments

data	A numeric matrix (rows x cols), or NULL.
header	A <a href="#">CiftiHeader</a> object (optional if axes given).
row_axis	A <a href="#">CiftiAxis</a> for rows.
col_axis	A <a href="#">CiftiAxis</a> for columns.
intent	Integer NIfTI intent code.
file_name	Character source file path.

### Value

A [CiftiImage](#) object.

---

CiftiImage-class

*CiftiImage Class*


---

### Description

A complete CIFTI-2 image: data matrix + header + axis descriptors.

**Usage**

```

## S4 method for signature 'CiftiImage'
show(object)

## S4 method for signature 'CiftiImage'
row_axis(x, ...)

## S4 method for signature 'CiftiImage'
col_axis(x, ...)

## S4 method for signature 'CiftiImage'
cifti_header(x, ...)

## S4 method for signature 'CiftiImage'
cifti_intent(x, ...)

## S4 method for signature 'CiftiImage'
cifti_data(x, ...)

## S4 method for signature 'CiftiImage'
dim(x)

## S4 method for signature 'CiftiImage'
brain_models(x, ...)

## S4 method for signature 'CiftiImage'
named_maps(x, ...)

## S4 method for signature 'CiftiImage'
volume_info(x, ...)

## S4 method for signature 'CiftiImage,character'
extract_structure(x, structure, ...)

## S4 method for signature 'CiftiImage,ANY,ANY'
x[i, j, ..., drop = FALSE]

```

**Arguments**

object	A CiftiImage object.
x	A CiftiImage object.
...	Additional arguments (ignored).
structure	Character string naming a brain structure (optional filter).
i	Row indices.
j	Column indices.
drop	Logical (ignored).

**Slots**

data A numeric matrix (or NULL for header-only reads).

header A [CiftiHeader](#) object.

row\_axis A [CiftiAxis](#) describing rows.

col\_axis A [CiftiAxis](#) describing columns.

intent Integer NIfTI intent code.

file\_name Character source file path (may be empty).

---

CiftiLabel-class      *CiftiLabel Class*

---

**Description**

A single label entry in a CIFTI label table.

**Slots**

key Integer key value.

label Character label string.

red Numeric red channel (0-1).

green Numeric green channel (0-1).

blue Numeric blue channel (0-1).

alpha Numeric alpha channel (0-1).

---

CiftiLabelTable-class      *CiftiLabelTable Class*

---

**Description**

A table of label entries for a named map.

**Slots**

labels A list of [CiftiLabel](#) objects.

---

CiftiMatrix-class      *CiftiMatrix Class*

---

### Description

Complete matrix metadata — contains all dimension descriptors.

### Slots

maps A list of [CiftiMatrixIndicesMap](#) objects.

metadata A named list of metadata key-value pairs.

---

CiftiMatrixIndicesMap-class  
*CiftiMatrixIndicesMap Class*

---

### Description

Describes one dimension of the CIFTI data matrix.

### Slots

applies\_to\_dimension Integer vector (0-based dimension indices this map applies to).

index\_type Character: one of the CIFTI\_INDEX\_TYPES values.

brain\_models List of [CiftiBrainModel](#) objects.

named\_maps List of [CiftiNamedMap](#) objects.

parcels List of [CiftiParcel](#) objects.

surfaces List of [CiftiSurface](#) objects.

volume A [CiftiVolume](#) or NULL.

series\_start Numeric start value for SERIES type.

series\_step Numeric step value for SERIES type.

series\_unit Character unit for SERIES type.

number\_of\_series\_points Integer count for SERIES type.

---

CiftiNamedMap-class     *CiftiNamedMap Class*

---

### Description

One named map entry (used in SCALARS and LABELS index types).

### Slots

map\_name Character string naming the map.  
 label\_table A [CiftiLabelTable](#) or NULL.  
 metadata A named list of metadata key-value pairs.

---

CiftiParcel-class     *CiftiParcel Class*

---

### Description

One parcel in a PARCELS index map.

### Slots

name Character parcel name.  
 surface\_vertices A named list mapping structure names to integer vectors of 0-based vertex indices.  
 voxel\_indices\_ijk Integer matrix (N x 3) of 0-based IJK voxel indices.

---

CiftiSurface-class     *CiftiSurface Class*

---

### Description

Surface metadata for a PARCELS index map.

### Slots

brain\_structure Character: canonical CIFTI structure string.  
 number\_of\_vertices Integer: total vertices on the surface.

---

CiftiVolume-class	<i>CiftiVolume Class</i>
-------------------	--------------------------

---

**Description**

Volume geometry reference (dimensions and affine transform).

**Slots**

dimensions Integer vector of length 3 (I, J, K).

transform A 4x4 numeric matrix (voxel-to-world affine).

---

col_axis	<i>Get the Column Axis of a CIFTI Object</i>
----------	--

---

**Description**

Get the Column Axis of a CIFTI Object

**Usage**

```
col_axis(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A [CiftiAxis](#) object.

---

dconn *Create a Dense Connectivity CIFTI Image*

---

### Description

Connectivity matrix between grayordinates (BrainModelAxis x BrainModelAxis).

### Usage

```
dconn(data, row_brain_model, col_brain_model = row_brain_model)
```

### Arguments

data            Numeric matrix (grayordinates x grayordinates).  
row\_brain\_model            A [BrainModelAxis](#) for rows.  
col\_brain\_model            A [BrainModelAxis](#) for columns (defaults to row\_brain\_model).

### Value

A [CiftiImage](#) with intent 3001.

---

dlabel *Create a Dense Label CIFTI Image*

---

### Description

Create a Dense Label CIFTI Image

### Usage

```
dlabel(data, brain_model, names = NULL, label_tables = NULL)
```

### Arguments

data            Integer matrix (maps x grayordinates) of label keys.  
brain\_model            A [BrainModelAxis](#) for columns.  
names            Character vector of map names.  
label\_tables            List of [CiftiLabelTable](#) objects.

### Value

A [CiftiImage](#) with intent 3007.

---

dpconn                      *Create a Dense-to-Parcel Connectivity CIFTI Image*

---

**Description**

Connectivity from grayordinates (rows) to parcels (columns).

**Usage**

```
dpconn(data, brain_model, parcels)
```

**Arguments**

data                      Numeric matrix (grayordinates x parcels).  
brain\_model              A [BrainModelAxis](#) for rows.  
parcels                   A [ParcelsAxis](#) for columns.

**Value**

A [CiftiImage](#) with intent 3010.

---

dscalar                    *Create a Dense Scalar CIFTI Image*

---

**Description**

Create a Dense Scalar CIFTI Image

**Usage**

```
dscalar(data, brain_model, names = NULL)
```

**Arguments**

data                      Numeric matrix (maps x grayordinates).  
brain\_model              A [BrainModelAxis](#) for columns.  
names                     Character vector of map names.

**Value**

A [CiftiImage](#) with intent 3006.

---

dtseries                      *Create a Dense Timeseries CIFTI Image*

---

### Description

Create a Dense Timeseries CIFTI Image

### Usage

```
dtseries(data, brain_model, start = 0, step = 1, unit = "SECOND")
```

### Arguments

data	Numeric matrix (time x grayordinates).
brain_model	A <a href="#">BrainModelAxis</a> for columns.
start	Numeric start time (default 0).
step	Numeric TR / time step.
unit	Character unit (default "SECOND").

### Value

A [CiftiImage](#) with intent 3002.

---

extract\_structure            *Extract Data for a Single Brain Structure*

---

### Description

Returns the sub-matrix corresponding to a specific brain structure from a CiftiImage.

### Usage

```
extract_structure(x, structure, ...)
```

### Arguments

x	A <a href="#">CiftiImage</a> object.
structure	Character string naming the structure (e.g., "cortex_left").
...	Additional arguments.

### Value

A list with elements data (matrix), axis (subsetting axis), and indices (column indices into the original data).

---

header\_to\_axes      *Convert CiftiHeader to Axis Objects*

---

**Description**

Convert CiftiHeader to Axis Objects

**Usage**

```
header_to_axes(header)
```

**Arguments**

header      A [CiftiHeader](#) object.

**Value**

A list with elements `row_axis` and `col_axis`.

---

iter\_structures      *Iterate Over Brain Structures*

---

**Description**

Returns a list of (structure\_name, slice) pairs for each brain structure in an axis.

**Usage**

```
iter_structures(x, ...)
```

**Arguments**

x      An axis object.  
...      Additional arguments.

**Value**

A named list of index ranges.

---

LabelAxis-class      *LabelAxis Class*

---

### Description

Describes a LABELS dimension — each entry is a named label map with an associated label table.

### Usage

```
## S4 method for signature 'LabelAxis'
show(object)

## S4 method for signature 'LabelAxis'
length(x)

## S4 method for signature 'LabelAxis,numeric,missing'
x[i, j, ..., drop = TRUE]
```

### Arguments

object	A LabelAxis object.
x	A LabelAxis object.
i	Numeric index vector.
j	Not used.
...	Additional arguments (ignored).
drop	Logical (ignored).

### Slots

name Character vector of map names.  
label List of [CiftiLabelTable](#) objects (one per map).  
meta List of named lists (metadata per map).

---

named\_maps      *Get Named Maps from an Object*

---

### Description

Get Named Maps from an Object

### Usage

```
named_maps(x, ...)
```

**Arguments**

- x                    A CIFTI object.
- ...                  Additional arguments.

**Value**

A list of [CiftiNamedMap](#) objects.

---

parcels\_from\_brain\_models  
*Create a ParcelsAxis from Brain Models*

---

**Description**

Create a ParcelsAxis from Brain Models

**Usage**

```
parcels_from_brain_models(named_brain_models)
```

**Arguments**

- named\_brain\_models                    A named list where each element is a [BrainModelAxis](#) and names are parcel names.

**Value**

A [ParcelsAxis](#) object.

---

ParcelsAxis-class            *ParcelsAxis Class*

---

**Description**

Describes a PARCELS dimension — each row/col maps to a named parcel.

**Usage**

```
## S4 method for signature 'ParcelsAxis'
show(object)

## S4 method for signature 'ParcelsAxis'
length(x)

## S4 method for signature 'ParcelsAxis,numeric,missing'
x[i, j, ..., drop = TRUE]

## S4 method for signature 'ParcelsAxis'
iter_structures(x, ...)
```

**Arguments**

object	A ParcelsAxis object.
x	A ParcelsAxis object.
i	Numeric index vector.
j	Not used.
...	Additional arguments (ignored).
drop	Logical (ignored).

**Slots**

parcel\_name Character vector of parcel names.

voxels List of integer matrices (N x 3) of 0-based IJK indices per parcel.

vertices List of named lists mapping structure names to integer vectors per parcel.

nvertices Named list mapping structure names to total vertex counts.

affine 4x4 numeric matrix or NULL.

volume\_shape Integer vector of length 3 or NULL.

---

 parse\_cifti\_xml

*Parse CIFTI-2 XML Header*


---

**Description**

Parses raw XML bytes (or a character string) from a CIFTI-2 NIFTI extension into a [CiftiHeader](#) object.

**Usage**

```
parse_cifti_xml(xml_data)
```

**Arguments**

xml\_data      Raw vector, character string, or xml2 document.

**Value**

A [CiftiHeader](#) object.

---

pconn      *Create a Parcel Connectivity CIFTI Image*

---

**Description**

Connectivity matrix between parcels (ParcelsAxis x ParcelsAxis).

**Usage**

```
pconn(data, row_parcels, col_parcels = row_parcels)
```

**Arguments**

data            Numeric matrix (parcels x parcels).  
row\_parcels    A [ParcelsAxis](#) for rows.  
col\_parcels    A [ParcelsAxis](#) for columns (defaults to row\_parcels).

**Value**

A [CiftiImage](#) with intent 3003.

---

pcseries      *Create a Parcel Series CIFTI Image*

---

**Description**

Parcel data with a series axis on rows (e.g., parcellated time series with parcels on both axes is ConnParcelSeries, intent 3009).

**Usage**

```
pcseries(data, parcels, start = 0, step = 1, unit = "SECOND")
```

**Arguments**

data	Numeric matrix (series x parcels).
parcels	A <a href="#">ParcelsAxis</a> for columns.
start	Numeric start value (default 0).
step	Numeric step value.
unit	Character unit (default "SECOND").

**Value**

A [CiftiImage](#) with intent 3009.

---

pdconn

*Create a Parcel-to-Dense Connectivity CIFTI Image*

---

**Description**

Connectivity from parcels (rows) to grayordinates (columns).

**Usage**

```
pdconn(data, parcels, brain_model)
```

**Arguments**

data	Numeric matrix (parcels x grayordinates).
parcels	A <a href="#">ParcelsAxis</a> for rows.
brain_model	A <a href="#">BrainModelAxis</a> for columns.

**Value**

A [CiftiImage](#) with intent 3011.

---

plabel *Create a Parcel Label CIFTI Image*

---

**Description**

Create a Parcel Label CIFTI Image

**Usage**

```
plabel(data, parcels, names = NULL, label_tables = NULL)
```

**Arguments**

data	Integer matrix (maps x parcels) of label keys.
parcels	A <a href="#">ParcelsAxis</a> for columns.
names	Character vector of map names.
label_tables	List of <a href="#">CiftiLabelTable</a> objects.

**Value**

A [CiftiImage](#) with intent 3012.

---

pscalar *Create a Parcel Scalar CIFTI Image*

---

**Description**

Create a Parcel Scalar CIFTI Image

**Usage**

```
pscalar(data, parcels, names = NULL)
```

**Arguments**

data	Numeric matrix (maps x parcels).
parcels	A <a href="#">ParcelsAxis</a> for columns.
names	Character vector of map names.

**Value**

A [CiftiImage](#) with intent 3008.

---

ptseries *Create a Parcel Timeseries CIFTI Image*

---

### Description

Create a Parcel Timeseries CIFTI Image

### Usage

```
ptseries(data, parcels, start = 0, step = 1, unit = "SECOND")
```

### Arguments

data	Numeric matrix (time x parcels).
parcels	A <a href="#">ParcelsAxis</a> for columns.
start	Numeric start time (default 0).
step	Numeric TR / time step.
unit	Character unit (default "SECOND").

### Value

A [CiftiImage](#) with intent 3004.

---

read\_cifti *Read a CIFTI-2 File*

---

### Description

Reads a CIFTI-2 file (.dtseries.nii, .dscalar.nii, .dlabel.nii, etc.) and returns a [CiftiImage](#).

### Usage

```
read_cifti(file_name, drop_data = FALSE)
```

### Arguments

file_name	Path to the CIFTI-2 file.
drop_data	If TRUE, only read the header/axes without loading the data matrix. Useful for inspecting large files.

### Details

The function reads the NIfTI-2 header using [RNifti](#), extracts the CIFTI-2 XML extension (ecode=32), parses it into axis objects, and optionally reads the binary data matrix.

**Value**

A [CiftiImage](#) object.

---

row\_axis

*Get the Row Axis of a CIFTI Object*


---

**Description**

Get the Row Axis of a CIFTI Object

**Usage**

```
row_axis(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A [CiftiAxis](#) object.

---

ScalarAxis-class

*ScalarAxis Class*


---

**Description**

Describes a SCALARS dimension — each entry is a named scalar map.

**Usage**

```
## S4 method for signature 'ScalarAxis'
show(object)

## S4 method for signature 'ScalarAxis'
length(x)

## S4 method for signature 'ScalarAxis,numeric,missing'
x[i, j, ..., drop = TRUE]

## S4 method for signature 'ScalarAxis'
c(x, ...)

## S4 method for signature 'ScalarAxis,ScalarAxis'
e1 == e2
```

**Arguments**

object	A ScalarAxis object.
x	A ScalarAxis object.
i	Numeric index vector.
j	Not used.
...	Additional arguments (ignored).
drop	Logical (ignored).
e1	First ScalarAxis.
e2	Second ScalarAxis.

**Slots**

name	Character vector of map names.
meta	List of named lists (metadata per map).

---

SeriesAxis-class	<i>SeriesAxis Class</i>
------------------	-------------------------

---

**Description**

Describes a SERIES dimension (e.g., time points).

**Usage**

```
## S4 method for signature 'SeriesAxis'
show(object)

## S4 method for signature 'SeriesAxis'
length(x)

## S4 method for signature 'SeriesAxis,numeric,missing'
x[i, j, ..., drop = TRUE]

## S4 method for signature 'SeriesAxis'
c(x, ...)

## S4 method for signature 'SeriesAxis,SeriesAxis'
e1 == e2
```

**Arguments**

object	A SeriesAxis object.
x	A SeriesAxis object.
i	Numeric index vector.
j	Not used.
...	Additional arguments (ignored).
drop	Logical (ignored).
e1	First SeriesAxis.
e2	Second SeriesAxis.

**Slots**

start	Numeric start value.
step	Numeric step size.
size	Integer number of points.
unit	Character unit string (one of CIFTI_SERIES_UNITS).

---

to_cifti_index	<i>Convert 1-based R Index to 0-based CIFTI Index</i>
----------------	---

---

**Description**

Convert 1-based R Index to 0-based CIFTI Index

**Usage**

```
to_cifti_index(x)
```

**Arguments**

x	An integer vector of 1-based indices.
---	---------------------------------------

**Value**

An integer vector of 0-based indices.

---

to\_cifti\_structure\_name

*Normalize a Brain Structure Name to CIFTI Convention*

---

### Description

Converts short names, common aliases, and partial matches to the canonical CIFTI\_STRUCTURE\_\* string.

### Usage

```
to_cifti_structure_name(name)
```

### Arguments

name                    A character string (e.g., "cortex\_left", "CORTEX\_LEFT", "CortexLeft", "CIFTI\_STRUCTURE\_CORTE

### Value

The canonical CIFTI structure string.

### Examples

```
to_cifti_structure_name("cortex_left")
to_cifti_structure_name("CORTEX_LEFT")
to_cifti_structure_name("CortexLeft")
```

---

to\_r\_index

*Convert 0-based CIFTI Index to 1-based R Index*

---

### Description

Convert 0-based CIFTI Index to 1-based R Index

### Usage

```
to_r_index(x)
```

### Arguments

x                        An integer vector of 0-based indices.

### Value

An integer vector of 1-based indices.

---

volume_info	<i>Get Volume Information</i>
-------------	-------------------------------

---

**Description**

Get Volume Information

**Usage**

```
volume_info(x, ...)
```

**Arguments**

x	A CIFTI object.
...	Additional arguments.

**Value**

A [CiftiVolume](#) object or NULL.

---

write_cifti	<i>Write a CIFTI-2 File</i>
-------------	-----------------------------

---

**Description**

Writes a [CiftiImage](#) to a CIFTI-2 NIfTI file.

**Usage**

```
write_cifti(x, file_name, data_type = "FLOAT32")
```

**Arguments**

x	A <a href="#">CiftiImage</a> object.
file_name	Output file path.
data_type	Data type for the binary data. One of "FLOAT32" (default) or "FLOAT64".

**Value**

Invisibly returns the file path.

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