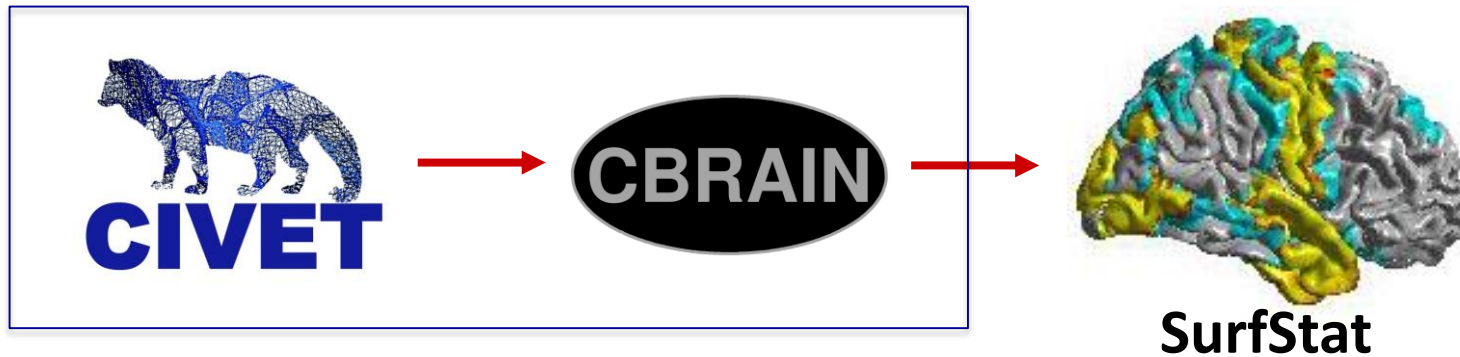


CIVET 2.0 (marching cubes), An Automated Pipeline For Structural Human MRI



Lindsay B. Lewis, Ph.D.

OMM

March 17, 2014

Outline



- **Who is behind CIVET?**
- What is CIVET?
- What's new in CIVET 2.0?
- Preparing your files for CIVET
- Running CIVET using the CBRAIN web-interface
- How do I make sense of my output? (Quality Control)
- Important Links

Who is behind CIVET?

Alan Evans' lab ("ACElab")



- Development, validation, advanced user support:

Claude Lepage (claudio@bic.mni.mcgill.ca)

- Validation, standard user support:

Lindsay Lewis (lindsay.lewis@mcgill.ca)

- CBRAIN web-based implementation of CIVET:

Marc-Étienne Rousseau, Natacha Beck (<https://cbrain.mcgill.ca/contact>)

Outline



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What is CIVET?

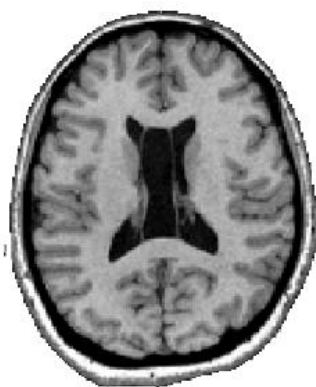


- **CIVET** is a structural human MRI cortical surface segmentation tool, developed (and supported) here at the BIC
- It performs the extraction and analysis of cortical surfaces from MR images (T1), including corticometric, morphometric and volumetric functions, e.g.:
 - cortical thickness, asymmetry at each vertex
 - cortical surface area
 - cortical volume
 - gyrification index (folding magnitude)
- The CIVET pipeline is fully-automated, ideal for large datasets / population studies, cortical network analyses, etc.
- User-friendly QC (quality control) tools

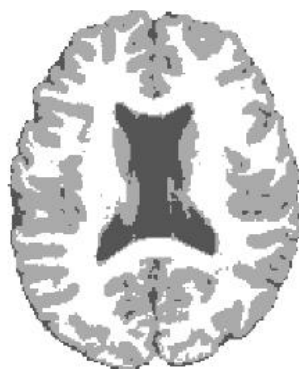
Extraction of Cortical Surfaces



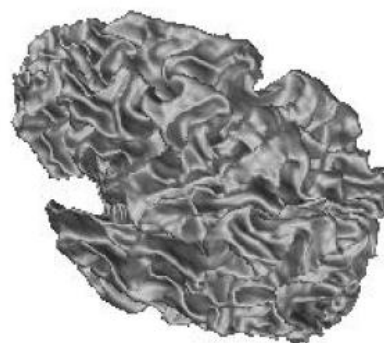
T1 image
*.mnc



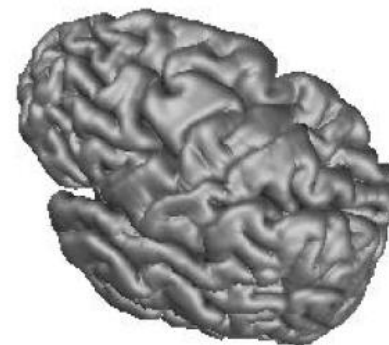
Tissue
Classification



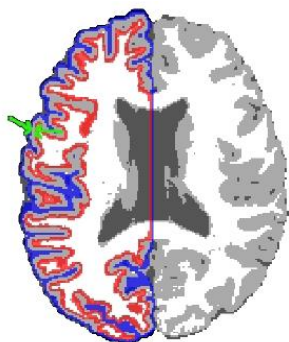
White Surface
*.obj



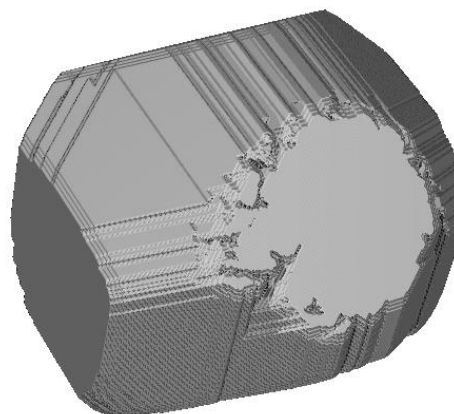
Gray Surface
*.obj



Cortical Thickness
*.txt



Marching cubes
tessellation



Outline



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What's new in CIVET 2.0:



■ Marching cubes:

- A marching-cubes algorithm has been implemented for the extraction of the white surface
- Yields higher quality surfaces with fewer extraction defects (i.e., sulcal bridges, surface misregistration, self-intersections)
- Replaces deformable ellipsoid model
- ***New average surface - vertex projection is slightly different from previous versions of CIVET!***

■ Gradient calibration:

- The white surface is adjusted locally to the maximum gradient position of the T1 image at the border between white and gray matter - yields improvements beyond basic global inhomogeneity correction
- Mostly affects the pre-central gyrus and occipital lobe, where previously the placement of the white surface had often led to artificially thin thickness values

■ High resolution surfaces (163848 vs. 40962 vertices per hemi)

Outline



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- Important Links

Preparing your files for CIVET:



- CIVET requires the image files to follow a strict naming convention:
 - `<prefix>_<id>_t1.mnc` (T1)
 - Examples:
 `example_001_t1.mnc`
 `example_002_t1.mnc`
- Optional files:
 - `<prefix>_<id>_t2.mnc` (T2)
 - `<prefix>_<id>_pd.mnc` (Proton-density)
 - `<prefix>_<id>_mask.mnc` (Native brain mask)

What if my files aren't MINC?



- CIVET requires image files to be in MINC format (*.mnc)
- If your files are not in MINC format, you have several options for conversion on the BIC server or CBRAIN:

DICOM:	dcm2mnc
NIfTI or Analyze:	nii2mnc

- For detailed instructions + sample perl scripts:

<http://www.bic.mni.mcgill.ca/ServicesSoftware/ConvertingOtherFileTypesToMINC>

Outline



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What is CBRAIN?

<https://portal.cbrain.mcgill.ca>



- The CBRAIN web-interface platform, developed by Alan Evans' lab ("ACElab"), allows registered users free access to the high-performance computing grid of Compute Canada.
- Useful for handling large datasets:
 - CIVET via CBRAIN: ~ 4 hrs processing time per subject, 1000+ subjects in ~24 hours, depending on CPU availability.
- Compute Canada cores:

• Mammouth-parallel II:	39,168 cores
• Guillimin:	20,176 cores
• Colosse:	7680 cores
• Mammouth-serial II:	1936 cores
• Westgrid:	7032 cores
- Convenience: reduced need for you to install specialized software locally; all you need is a web browser.

The Big Picture of CIVET/CBRAIN:



- (1) Upload your *.mnc files to an SFTP server on CBRAIN
- (2) Register them to a project
- (3) Delete your *.mnc files off the SFTP server (temp storage only)
- (4) Run CIVET on the files in your project on CBRAIN
- (5) View Quality Control (QC) images of output on CBRAIN
- (6) Copy your CIVET output to the SFTP server
- (7) Download your CIVET output off the SFTP server to your computer
- (8) Delete your CIVET output off the SFTP server (temp storage only)
- (9) Run group analyses on your computer (e.g., SurfStat)

Running CIVET using the CBRAIN web-interface:



File Edit View History Bookmarks Tools Help

CBRAIN - Login

https://portal.cbrain.mcgill.ca/login

Rev: 3.1.12-51

CBRAIN - Login

 Sign in with your Email

or

Login

Password

[Forgot your password?](#)

Powered by CBRAIN

[Credits](#)

Create a project:



File Edit View History Bookmarks Tools Help

CBRAIN - Projects +

https://portal.cbrain.mcgill.ca/groups

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Projects

Create Project View Options Help

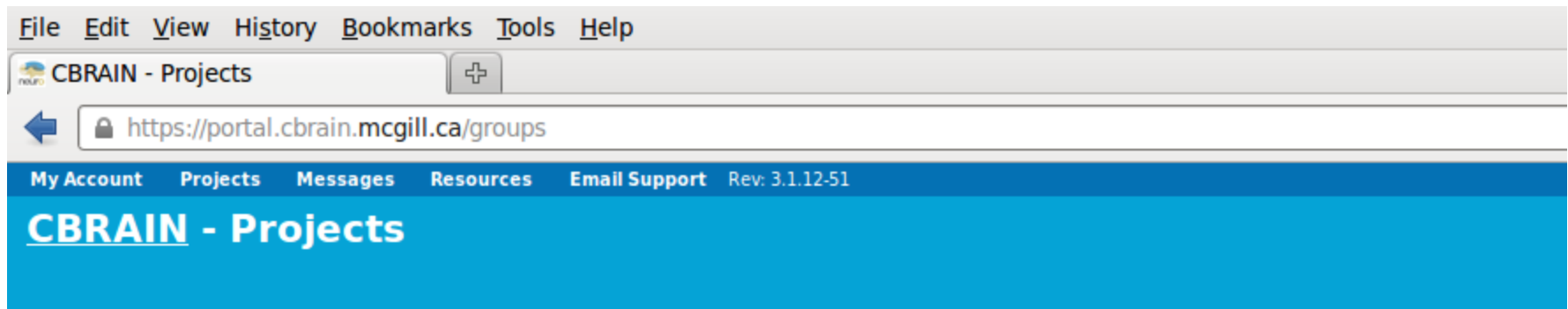
Name

Description

The first line should be a short summary, and the rest are for details.

Create

Create a project:



Create Project [View Options](#) [Help](#)

Name

Description

The first line should be a short summary, and the rest are for details.

Click on the project box:



File Edit View History Bookmarks Tools Help

CBRAIN - Projects

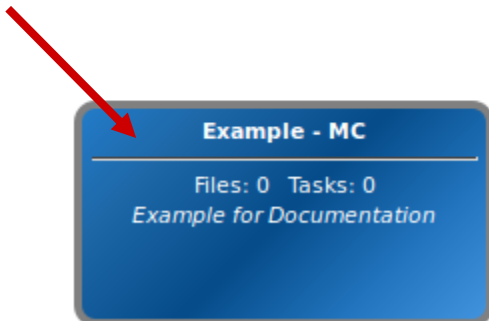
https://portal.cbrain.mcgill.ca/groups

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Projects

Project was successfully created.

Create Project View Options Help



Click on “Upload File” (if you only have a few*):



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(0 files) Search by name:

☐	Filename ▼	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
There are no entries in this table.								

Synchronization symbols: ✓: InSync *: ProvNewer ✖: CacheNewer ✖: Corrupted ↓: ToCache ↑: ToProvider

Select *.mnc files for upload:



File Edit View History Bookmarks Tools Help

CBRAIN

https://portal.cbrain.mcgill.ca/userfiles/new

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC

Files Tasks

Select file to upload:

Where to upload the file

Data Provider for uploaded file:

Content handling

Archive options (for zip or tar files):

Save file:
Save the file or the archive to the Data Provider as is.

Create collection:
Extract all the files from the archive and create a single collection.

Auto-extract:
Extract the files from the archive and individually register them as entries.

Other properties (optional)

File type:

Project permissions:

Select tags for file:

Select *.mnc files for upload:



[File](#) [Edit](#) [View](#) [History](#) [Bookmarks](#) [Tools](#) [Help](#)

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

[My Account](#) [Projects](#) [Messages](#) [Resources](#) [Email Support](#) Rev: 3.1.12-51

CBRAIN - Example - MC - Files

[Files](#) [Tasks](#)

File 'example_001_t1.mnc' being added in background.

[Upload File](#) [Launch Task](#) [File Management](#) [Update Attributes](#) [Selected Files](#) [Filters](#) [View Options](#)

(1 files)

Search by name:

☐	Filename ▼	• File Type	• Owner	Creation Date	Size	Tags	Project Access	• Provider
☐	 example_001_t1.mnc ↓	Minc File	llewis	2014-02-27	unknown		Read Only	MainStore

Synchronization symbols: ✓: InSync ✱: ProvNewer ⚡: CacheNewer ✖: Corrupted ↓: ToCache ↑: ToProvider

Repeat upload procedure for each *.mnc file:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded System

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(3 files) Search by name:

☐	Filename ▼	• File Type	• Owner	Creation Date	Size	Tags	Project Access	• Provider
☐	 example_001_t1.mnc ✓	Minc File	llewis	2014-02-27	10.7 Mb		Read Only	MainStore
☐	 example_002_t1.mnc ✓	Minc File	llewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	 example_003_t1.mnc ✓	Minc File	llewis	2014-02-27	11.0 Mb		Read Only	MainStore

Synchronization symbols: ✓: InSync * : ProvNewer ∴: CacheNewer ✗: Corrupted ↓: ToCache ↑: ToProvider

Or, to upload many files at once:



- You can use a GUI drag / drop SFTP client with port 7500, e.g. Filezilla

OR

- You can use command-line SFTP:
 - `cd <dir_name_containing_mnc_files>`
 - `sftp -oPort=7500 <username>@brainstorm.cbrain.mcgill.ca`
 - `put *.mnc`

Click on “Resources,” drop-down menu to “Data Providers”:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbbrain.mcgill.ca/userfiles#

My Account Projects Messages **Resources** Email Support Rev: 3.1.12-67

CBRAIN - Example

Files Tasks

Data Providers
Servers
Tools

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(0 files)

Search by name:

Filename ▼	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
There are no entries in this table.							

Synchronization symbols: ✓: InSync *: ProvNewer ✖: CacheNewer ✖: Corrupted ↓: ToCache ↑: ToProvider

Click on “Browse” to the right of your Data Provider:



File Edit View History Bookmarks Tools Help

CBRAIN - Data Providers

https://portal.cbrain.mcgill.ca/data_providers

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Data Providers

Files Tasks

Show Details User Access Report Transfer Restrictions Report Disk Usage Report Help

Official Data Storage

Provider Name ▼	• Project	Online?	Alive?	Files	Mode	Operations
MainStore	everyone	Yes	Yes	1224	Read/Write	
MindStore	everyone	Yes	Yes	34	Read/Write	
User-Archive	everyone	Yes	Yes	0	Read/Write	
WorkdirSystemArchive	everyone	Yes	Yes	113	Read/Write	
WorkdirSystemArchive2	everyone	Yes	Yes	0	Read/Write	

User or Site Storage

Provider Name ▼	• Project	Online?	Alive?	Files	Mode	Operations
BiqBrain-Volumes	BiqBrain-Distribution	Yes	Yes	0	Read Only	Browse
SFTP-Brainstorm	everyone	Yes	Yes	0	Read/Write	Browse
SFTP-Incoming	everyone	Yes	Yes	0	Read/Write	Browse

You should see a list of the files that you already uploaded:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

- Register Files Unregister Files Delete Files View Options

Files Available On Remote Data Provider 'SFTP-Brainstorm'

(3 files)

Search by name:

☐	Name	Size	Type	Last modified	Registered?	Note
			All files as... All directories as...			
☐	example_001_t1.mnc	10696777	Minc File	2014-03-14 15:49:50 EDT	No	
☐	example_002_t1.mnc	10958871	Minc File	2014-03-14 15:49:51 EDT	No	
☐	example_003_t1.mnc	10982941	Minc File	2014-03-14 15:49:52 EDT	No	

Important note about the behavior of this Data Provider: Files registered on the Data Provider will only be **unregistered** if the **Delete** button of the file manager is used. Please use the **Delete Files** panel above to remove them completely.

Checkbox all:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Register Files Unregister Files Delete Files View Options

Files Available On Remote Data Provider 'SFTP-Brainstorm'

(3 files)

Search by name:

☒	Name	Size	Type	Last modified	Registered?	Note
			All files as... All directories as...			
☒	example_001_t1.mnc	10696777	Minc File	2014-03-14 15:49:50 EDT	No	
☒	example_002_t1.mnc	10958871	Minc File	2014-03-14 15:49:51 EDT	No	
☒	example_003_t1.mnc	10982941	Minc File	2014-03-14 15:49:52 EDT	No	

Important note about the behavior of this Data Provider: Files registered on the Data Provider will only be **unregistered** if the **Delete** button of the file manager is used. Please use the **Delete Files** panel above to remove them completely.

Move your files from the temporary SFTP server to “Mainstore”:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Register Files Unregister Files Delete Files View Options

This panel allows you to **register** files that are present on the remote Data Provider, but not yet known by the CBRAIN interface. Once registered, a file will be visible in the **Files** manager, and can be used for launching tasks.

We recommend that you use this Data Provider only to transfer data in and out of CBRAIN. When registering files, as you can see below, you can have them automatically moved or copied to another official CBRAIN Data Provider. **In fact, this particular Data Provider leaves you no choice** and you **MUST** select another Data Provider where your files will be copied or moved. Once files are copied to another official Data Provider, we recommend you clean up the files here using the **Delete Files** panel, further right.

When registering, automatically...

↓ ... assign them to project ... ↓ ↓ ... move or copy them ... ↓ ↓ ... to ... ↓ (info)

Example_MC ... MOVE the files to Data Provider -> (Select another Data Provider) **Register the files!**

Important notes about automatically copying and moving files:

- The MOVE or COPY operation will start in background as soon as you click 'Register files'.
- While the operation is in progress, do not modify the files on the remote Data Provider!
- While a COPY operation is in progress, there will seem to be two registered versions of the file in the file manager (one on each Data Provider).
- After a COPY operation is done, the files will still be visible here and will no longer seem to be registered.

Move your files from the temporary SFTP server to “Mainstore”, click “Register the Files!”:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Register Files Unregister Files Delete Files View Options

This panel allows you to **register** files that are present on the remote Data Provider, but not yet known by the CBRAIN interface. Once registered, a file will be visible in the **Files** manager, and can be used for launching tasks.

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When registering, automatically...

↓ ... assign them to project ... ↓ ↓ ... move or copy them ... ↓ ↓ ... to ... ↓ (info)

Example_MC ... MOVE the files to Data Provider -> MainStore **Register the files!**

Important notes about automatically copying and moving files:

- The MOVE or COPY operation will start in background as soon as you click 'Register files'.
- While the operation is in progress, do not modify the files on the remote Data Provider!
- While a COPY operation is in progress, there will seem to be two registered versions of the file in the file manager (one on each Data Provider).
- After a COPY operation is done, the files will still be visible here and will no longer seem to be registered.

Checkbox all files and delete them off the temporary SFTP server:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Registered 3 files.

Register Files Unregister Files **Delete Files** View Options

Files Available On Remote

This panel allows you to **delete permanently** files that are present on the remote Data Provider. Note that this operation will work whether or not the files are registered. If they are registered, they will be unregistered first.

Delete the files!

☒	Name	Size	Type	Last modified	Registered?	Note
☒	example_001_t1.mnc	10696777	All files as... All directories as...	2014-03-14 15:49:50 EDT	Registered	
☒	example_002_t1.mnc	10958871	MincFile	2014-03-14 15:49:51 EDT	Registered	
☒	example_003_t1.mnc	10982941	MincFile	2014-03-14 15:49:52 EDT	Registered	

Important note about the behavior of this Data Provider: Files registered on the Data Provider will only be **unregistered** if the **Delete** button of the file manager is used. Please use the **Delete Files** panel above to remove

Click on Files:



File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Register Files Unregister Files Delete Files View Options

Files Available On Remote Data Provider 'SFTP-Brainstorm'

(0 files)

Search by name:

Type					
☐	Name	Size	All files as...	Last modified	Registered?
			All directories as...	Note	

Important note about the behavior of this Data Provider: Files registered on the Data Provider will only be **unregistered** if the **Delete** button of the file manager is used. Please use the **Delete Files** panel above to remove them completely.

Checkbox each *.mnc file:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded System

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(3 files) Search by name:

☒	Filename ▼	• File Type	• Owner	Creation Date	Size	Tags	Project Access	• Provider
☒	 example_001_t1.mnc ✓	Minc File	llewis	2014-02-27	10.7 Mb		Read Only	MainStore
☒	 example_002_t1.mnc ✓	Minc File	llewis	2014-02-27	11.0 Mb		Read Only	MainStore
☒	 example_003_t1.mnc ✓	Minc File	llewis	2014-02-27	11.0 Mb		Read Only	MainStore

Synchronization symbols: ✓: InSync * : ProvNewer ∴: CacheNewer ✗: Corrupted ↓: ToCache ↑: ToProvider

Click on “Launch Task”:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded System

Upload File **Launch Task** File Management Update Attributes Selected Files Filters View Options

This panel allows you to launch the scientific tasks that have been made available to you. First, select the files you want to process in the table below using their checkboxes. Then select one of the tasks here. You will be presented with a new selection box allowing you to choose which Execution Server will process your task.

Each task has its own preferences as to how many files it needs and what type they should be. Once the task has validated that you've selected the proper files to process, you'll be presented with a form where you can customize its scientific parameters.

Select a task to launch

Provider
ainStore
ainStore
ainStore

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded

System

Upload File

Launch Task

File Management

Update Attributes

Selected Files

Filters

View Options

This panel allows you to launch the scientific tasks that have been made available to you. First, select the files you want to process in the table below using their checkboxes. Then select one of the tasks here. You will be presented with a new selection box allowing you to choose which Execution Server will process your task.

Each task has its own preferences as to how many files it needs and what type they should be. Once the task has validated that you've selected the proper files to process, you'll be presented with a form where you can customize its scientific parameters.

Launch Civet

Select a task to launch

Conversion Tools

Asipro -> MINC

DICOM -> MINC

DICOM -> NiftI

DICOM -> HRRT

MINC -> Analyze

MINC -> JIV

MincConvert

MINC -> NiftI

NiftI -> MINC

Scientific Tools

Launch Civet QC on CivetStudy

Launch Civet

Launch CivetCombiner

Launch Cw5

Launch Cw5filter

Launch Bedpostx

Launch Bet (FSL)

Launch Feat (FSL)

Launch Tool

Provider

ainStore

ainStore

ainStore

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded

System

Upload File

Launch Task

File Management

Update Attributes

Selected Files

Filters

View Options



ex

ex

ex

S

This panel allows you to launch the scientific tasks that have been made available to you. First, select the files you want to process in the table below using their checkboxes. Then select one of the tasks here. You will be presented with a new selection box allowing you to choose which Execution Server will process your task.

Each task has its own preferences as to how many files it needs and what type they should be. Once the task has validated that you've selected the proper files to process, you'll be presented with a form where you can customize its scientific parameters.

Launch Civet

Server & Version:

Select Server & Version

Launch Tool

Provider

[ainStore](#)[ainStore](#)[ainStore](#)

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded

System

Upload File

Launch Task

File Management

Update Attributes

Selected Files

Filters

View Options

This panel allows you to launch the scientific tasks that have been made available to you. First, select the files you want to process in the table below using their checkboxes. Then select one of the tasks here. You will be presented with a new selection box allowing you to choose which Execution Server will process your task.

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Launch Civet

Server & Version:

Select Server & Version

Launch Tool

Select Server & Version

On Colosse:

CIVET 1.1.10 (parallel x 8)

CIVET 1.1.11 (parallel x 8)

CIVET 1.1.12 on Feb2013 Quarantine

On Guillimin:

ACELab CIVET 1.1.11 (parallel x 12)

DEVs CIVET 1.1.11 (parallel x 12)

CIVET 1.1.11 on Nov2011 Quarantine

CIVET 1.1.12 on Feb2013 Quarantine

On Mammoth-S:

CIVET 1.1.11

CIVET 1.1.12 on Feb2013 Quarantine

Civet 2.0.0

On MindStorm:

CIVET 1.1.12

Provider

[ainStore](#)[ainStore](#)[ainStore](#)

*Once an execution server is chosen, we recommend using the same server for all future analyses with that dataset

CBRAIN - Example - MC - Files

Files Tasks

File Uploaded**System**

Upload File

Launch Task

File Management

Update Attributes

Selected Files

Filters

View Options



ex

ex

ex

S

This panel allows you to launch the scientific tasks that have been made available to you. First, select the files you want to process in the table below using their checkboxes. Then select one of the tasks here. You will be presented with a new selection box allowing you to choose which Execution Server will process your task.

Each task has its own preferences as to how many files it needs and what type they should be. Once the task has validated that you've selected the proper files to process, you'll be presented with a form where you can customize its scientific parameters.

Launch Civet

Server & Version:

Civet 2.0.0

Launch Tool

Latest load information about this Execution ServerMost recent wait time before execution starts: 1 minute and 10 seconds ([superb](#))

(This happened 1 day and 3 hours ago)

Number of active tasks (all users): 0

Number of queued tasks (all users): 0

Number of running tasks (all users): 0

Provider[ainStore](#)[ainStore](#)[ainStore](#)

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files

Description:

Owner:

llewis (Lindsay Lewis)

Project:

Example - M

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Model for stereotaxic registration:

Default:

“icbm152nl” (MNI ICBM152 non-linear 6th generation)

Also available:

“icbm152nl_09s” (MNI ICBM152 non-linear symmetric (2009))

“icbm152nl_09a” (MNI ICBM152 non-linear asymmetric (2009))

“icbm152lin” (MNI ICBM152 linear)

“ADNI hires” (MNI ADNI non-linear and hires)

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files (info)

Description:

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Template (voxel resolution in mm) for stereotaxic registration:

Default: 1.00

Also available: 0.50, 0.75

CBRAIN - Example - MC - Launch Civet

Files

Tasks

Launch Civet Task

Task Control: [\(show/hide\)](#)

Server & Version:

Civet 2.0.0

Save results to:Data provider of input files [\(info\)](#)**Description:**

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: [\(show/hide\)](#)

Task Parameters [\(Help\)](#) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)N3 distance:

of parameters / DOF to be used in transformation for linear registration:

Default: 9

Also available: 6, 12

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files (info)

Description:

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Interpolation method from native to stereotaxic space:

Default: trilinear

Also available: tricubic, sinc

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files (info)

Description:

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Head height in mm for neck cropping:

Default: 0

Suggested value, if used: 170

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files (info)

Description:

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Mask blood vessels prior to white surface extraction:

Default: off

CBRAIN - Example - MC - Launch Civet

Files Tasks

Launch Civet Task

Task Control: (show/hide)

Server & Version:

Civet 2.0.0

Save results to:

Data provider of input files (info)

Description:

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: (show/hide)

Task Parameters (Help) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

N3 spline distance in mm (REQUIRED):

3T: suggested value is 50-125 (CIVET 2.0 is less sensitive to the particular value chosen)

1.5T: suggested value is 200

MP2RAGE: suggested value is 0

CBRAIN - Example - MC - Launch Civet

Files

Tasks

Launch Civet Task

Task Control: [\(show/hide\)](#)

Server & Version:

Civet 2.0.0

Save results to:Data provider of input files [\(info\)](#)**Description:**

(This first line should be a short summary, and the rest are your notes)

Owner:

llewis (Lindsay Lewis)

Project:

Example - MC

Preset Management: [\(show/hide\)](#)

Task Parameters [\(Help\)](#) :

Model: icbm152nl

Template: 1.00

Degrees of freedom for linear registration: 9

Interpolation: trilinear

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: (CIVET 2.0.0 or later; ignored otherwise)

N3 distance: 100

N3 spline distance in mm (REQUIRED):

3T: suggested value is 50-125 (CIVET 2.0 is less sensitive to the particular value chosen)

1.5T: suggested value is 200

MP2RAGE: suggested value is 0

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

High resolution surface option

(new in CIVET 2.0):

163848 vs. 40962 vertices per hemi

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Cortical thickness metric:

Default: tlink

Also available: tlaplace, tnear, "tfs" (Freesurfer-like)

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Cortical thickness blurring kernel (in mm):

Default: 30

New in CIVET 2.0: List of integers for multiple kernels, e.g., 10:20:30

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Surface Parcellation:

Default: Lobar

Also available: AAL

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Area and volume blurring kernels (in mm):

Default: 40

New in CIVET 2.0: List of integers for multiple kernels, e.g., 10:20:30

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Volume Options

Model:

Template:

Degrees of freedom for linear registration:

Interpolation:

Head height: (CIVET 1.1.12 or later; ignored otherwise)

Mask blood vessels: ☐ (CIVET 2.0.0 or later; ignored otherwise)

N3 distance:

Surface options

Do NOT build surfaces: ☐

High resolution surface: ☐ (CIVET 2.0.0 or later; ignored otherwise)

Combine left/right surfaces: ☒

Thickness method: and kernel size: (30mm by default if left blank)

Resample surfaces: ☒

Surface parcellation:

With kernel size areas: (only for CIVET 1.1.11 or later; ignored otherwise)

With kernel size volumes: (only for CIVET 1.1.11 or later; ignored otherwise)

VBM Options

Process VBM files: ☐

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID
☒	example_001_t1.mnc	example	001
☒	example_002_t1.mnc	example	002
☒	example_003_t1.mnc	example	003

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

VBM:

Default: off

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID	T2 found?	
☒	example_001_t1.mnc	example	001	×	›
☒	example_002_t1.mnc	example	002	×	›
☒	example_003_t1.mnc	example	003	×	›

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Prefix pattern: Subject ID pattern:

The patterns can include special *components* ([toggle explanation](#)) like `{1}`, `{2}` etc which will extract pieces of text from the **T1 Name**.

Click [Refresh this list](#) to see all the Prefix and Subject IDs automatically updated. You can try this as often as you want, until you're satisfied.

Optional Output Renaming ([Show](#))

Optional post-CIVET operations ([Show](#))

**Required for QC: click on Show
“Optional post-CIVET operations”!**

[Start Civet](#)

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID	T2 found?	PD found?
☒	example_001_t1.mnc	example	001	×	×
☒	example_002_t1.mnc	example	002	×	×
☒	example_003_t1.mnc	example	003	×	×

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Prefix pattern: Subject ID pattern:

The patterns can include special *components* ([toggle explanation](#)) like `{1}`, `{2}` etc which will extract pieces of text from the **T1 Name**.

Click [Refresh this list](#) to see all the Prefix and Subject IDs automatically updated. You can try this as often as you want, until you're satisfied.

Optional Output Renaming ([Show](#))

Optional post-CIVET operations ([Show](#))

- Combine CIVET results into a CivetStudy named: using CivetCombiner version:
- Launch ☐ Claude's QC script on that CivetStudy using CivetQc version:

[Start Civet](#)

Give your QC folder a name

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID	T2 found?	PD found?
☒	example_001_t1.mnc	example	001	×	×
☒	example_002_t1.mnc	example	002	×	×
☒	example_003_t1.mnc	example	003	×	×

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Prefix pattern: Subject ID pattern:

The patterns can include special *components* ([toggle explanation](#)) like {1}, {2} etc which will extract pieces of text from the **T1 Name**. Click [Refresh this list](#) to see all the Prefix and Subject IDs automatically updated. You can try this as often as you want, until you'

Optional Output Renaming ([Show](#))

Optional post-CIVET operations ([Show](#))

- Combine CIVET results into a CivetStudy named: using CivetCombiner version:
- Launch ☐ Claude's QC script on that CivetStudy using CivetQc version:

On Colosse:

Latest CBRAIN version

On Guillimin:

Latest CBRAIN version

On Mammoth-S:

Latest CBRAIN version

On MindStorm:

Latest CBRAIN version

On Zealous:

Latest CBRAIN version

Latest CBRAIN version

[Start Civet](#)

Choose the latest CBRAIN version on the same execution server as you already chose

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID	T2 found?	PD found?
☒	example_001_t1.mnc	example	001	x	x
☒	example_002_t1.mnc	example	002	x	x
☒	example_003_t1.mnc	example	003	x	x

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Prefix pattern: Subject ID pattern:

The patterns can include special *components* ([toggle explanation](#)) like {1}, {2} etc which will extract pieces of text from the **T1 Name**.

Click [Refresh this list](#) to see all the Prefix and Subject IDs automatically updated as you want, until you're satisfied.

Optional Output Renaming ([Show](#))

Optional post-CIVET operations ([Show](#))

- Combine CIVET results into a CivetStudy named: CivetCombiner version:
- Launch ☐ Claude's QC script on that CivetStudy using CivetQc version:

On Colosse:

CIVET QC Tool 1.1.11
CIVET QC Tool 1.1.12

On Guillimin:

CIVET QC Tool 1.1.11
CIVET QC Tool 1.1.12

On Mammouth-S:

CIVET QC Tool 1.1.11
CIVET QC Tool 1.1.12

Civet 2.0.0

[Start Civet](#)

Choose the same CIVET version number and same execution server as you already chose

MINC file input list

☒ Launch CIVET?	T1 name	Prefix	Subject ID	T2 found?	PD found?
☒	example_001_t1.mnc	example	001	×	×
☒	example_002_t1.mnc	example	002	×	×
☒	example_003_t1.mnc	example	003	×	×

Convenience helper: provide overall patterns for the **Prefix** and **Subject ID**:

Prefix pattern: Subject ID pattern:

The patterns can include special *components* ([toggle explanation](#)) like {1}, {2} etc which will extract pieces of text from the **T1 Name**.

Click [Refresh this list](#) to see all the Prefix and Subject IDs automatically updated. You can try this as often as you want, until you're satisfied.

Optional Output Renaming ([Show](#))

Optional post-CIVET operations ([Show](#))

- Combine CIVET results into a CivetStudy named: using CivetCombiner version:
- Launch ☒ Claude's QC script on that CivetStudy using CivetQc version:

[Start Civet](#)

Check "Launch Claude's QC script,"
and then "Start Civet"

“New” tasks appear:



File Edit View History Bookmarks Tools Help

CBRAIN - Tasks

https://portal.cbrain.mcgill.ca/tasks

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Tasks

Files **Tasks**

Launching 3 Civet tasks in background.

Update Attributes For Failed Tasks For Completed Tasks Terminating And Cleaning Up Archiving Filters View

Currently in Batch View (3 tasks) Total task s

☐	Task Type	Description	Owner	Execution Server	Current Status	Run Number	Workdir Size	Time Submitted
☐	Civet (Expand Batch)	example_001_t1.mnc	llewis	Mammouth-S	3 x New		0 bytes	2014-02-27 15:36:08 EST

Workdir archiving status symbols: On Cluster As File

A few hours later:



File Edit View History Bookmarks Tools Help

CBRAIN - Tasks

https://portal.cbrain.mcgill.ca/tasks

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Tasks

Files Tasks

Task CivetQc Completed Successfully	System	2014-03-12 23:00:50 EDT	Mark as Read Delete
Task CivetCombiner Completed Successfully	System	2014-03-12 23:00:06 EDT	Mark as Read Delete
Task Civet Completed Successfully	System	2014-03-12 22:58:39 EDT	Mark as Read Delete

[Update Attributes](#) [For Failed Tasks](#) [For Completed Tasks](#) [Terminating And Cleaning Up](#) [Archiving](#) [Filters](#) [View](#)

Currently in Batch View (5 tasks) Total tasks

☐	Task Type	Description	Owner	Execution Server	Current Status	Run Number	Workdir Size	Time Submitted
☐	CIVET QC tool	Example_MC_QC	llewis	Mammouth-S	Completed	1	53.2 Kb	2014-02-27 15:36:09 EST
☐	CivetCombiner	Example_MC_QC	llewis	Mammouth-S	Completed	1	4.1 Kb	2014-02-27 15:36:08 EST
☐	Civet (Expand Batch)	example_001_t1.mnc	llewis	Mammouth-S	3 x Completed		613.9 Mb	2014-02-27 15:36:08 EST

Workdir archiving status symbols: ♦: On Cluster ▼: As File

***Be attentive to any RED messages under "Current Status" that indicate any errors or incomplection**

Click back to “Files” tab:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(7 files)

Search by name:

	Filename ▼	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
☐	example_001_t1.mnc ✓	Minc File	Ilewis	2014-02-27	10.7 Mb		Read Only	MainStore
☐	001-Mammouth-S-203491-1 ✓	Civet Output	Ilewis	2014-02-27	203.7 Mb (226 files)		Read Only	MainStore
☐	example_002_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	002-Mammouth-S-203492-1 ✓	Civet Output	Ilewis	2014-02-27	203.9 Mb (226 files)		Read Only	MainStore
☐	example_003_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	003-Mammouth-S-203493-1 ✓	Civet Output	Ilewis	2014-02-27	205.0 Mb (226 files)		Read Only	MainStore
☐	Example_MC_QC ✓✓	Civet Study	Ilewis	2014-02-27	612.7 Mb (699 files)		Read Only	MainStore

Synchronization symbols: ✓: InSync * : ProvNewer ⚡ : CacheNewer ✗ : Corrupted ↓ : ToCache ↑ : ToProvider

Click on any individual output file collection to see contents:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(7 files)

Search by name:

	Filename ▼	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
☐	 example_001_t1.mnc ✓	Minc File	Ilewis	2014-02-27	10.7 Mb		Read Only	MainStore
☐	 001-Mammouth-S-203491-1 ✓	Civet Output	Ilewis	2014-02-27	203.7 Mb (226 files)		Read Only	MainStore
☐	 example_002_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	 002-Mammouth-S-203492-1 ✓	Civet Output	Ilewis	2014-02-27	203.9 Mb (226 files)		Read Only	MainStore
☐	 example_003_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	 003-Mammouth-S-203493-1 ✓	Civet Output	Ilewis	2014-02-27	205.0 Mb (226 files)		Read Only	MainStore
☐	 Example_MC_QC ✓ ✓	Civet Study	Ilewis	2014-02-27	612.7 Mb (699 files)		Read Only	MainStore

Synchronization symbols: ✓: InSync * : ProvNewer ⚡ : CacheNewer ✗ : Corrupted ↓ : ToCache ↑ : ToProvider

CBRAIN - Example - MC - File Info

[Files](#) [Tasks](#)[Delete](#)[Download Collection](#)Info [\(Edit\)](#)

Name: 001-Mammoth-S-203491-1 **Created at:** 2014-03-12 22:58:30 EDT (15 hours, 34 minutes and 44 seconds ago)
Type: Civet Output **Modified at:** 2014-03-12 22:58:39 EDT (15 hours, 34 minutes and 35 seconds ago)
Size: 198.9 Mb (223 files) = 198873466 bytes **Data Provider:** [MainStore](#) (EnCbrainSmartDataProvider) Cached: ✓ ✓
Owner: [llewis](#) **Project:** [Example MC](#)
Tags: **Project permission on file:** Read
Hidden file: ☐ H **Immutable file:** ☐ I
Parent: [example 001 t1.mnc](#)

[<< Previous File](#)[Next File >>](#)[<< Previous CivetOutput](#)

Content

Civet Output

[Change View](#)[Show Displayable Contents](#)
[Civet Directories Explained](#)

☐	File	Size
☐	 CBRAIN_Mammoth-S-203491-1.params.yml	893 bytes
☐	 References.txt	5.2 Kb
	 classify Expand	
	 final Expand	
	 logs Expand	
	 mask Expand	
	 native Expand	

Click on “Show Displayable Contents” to see QC images

Outline

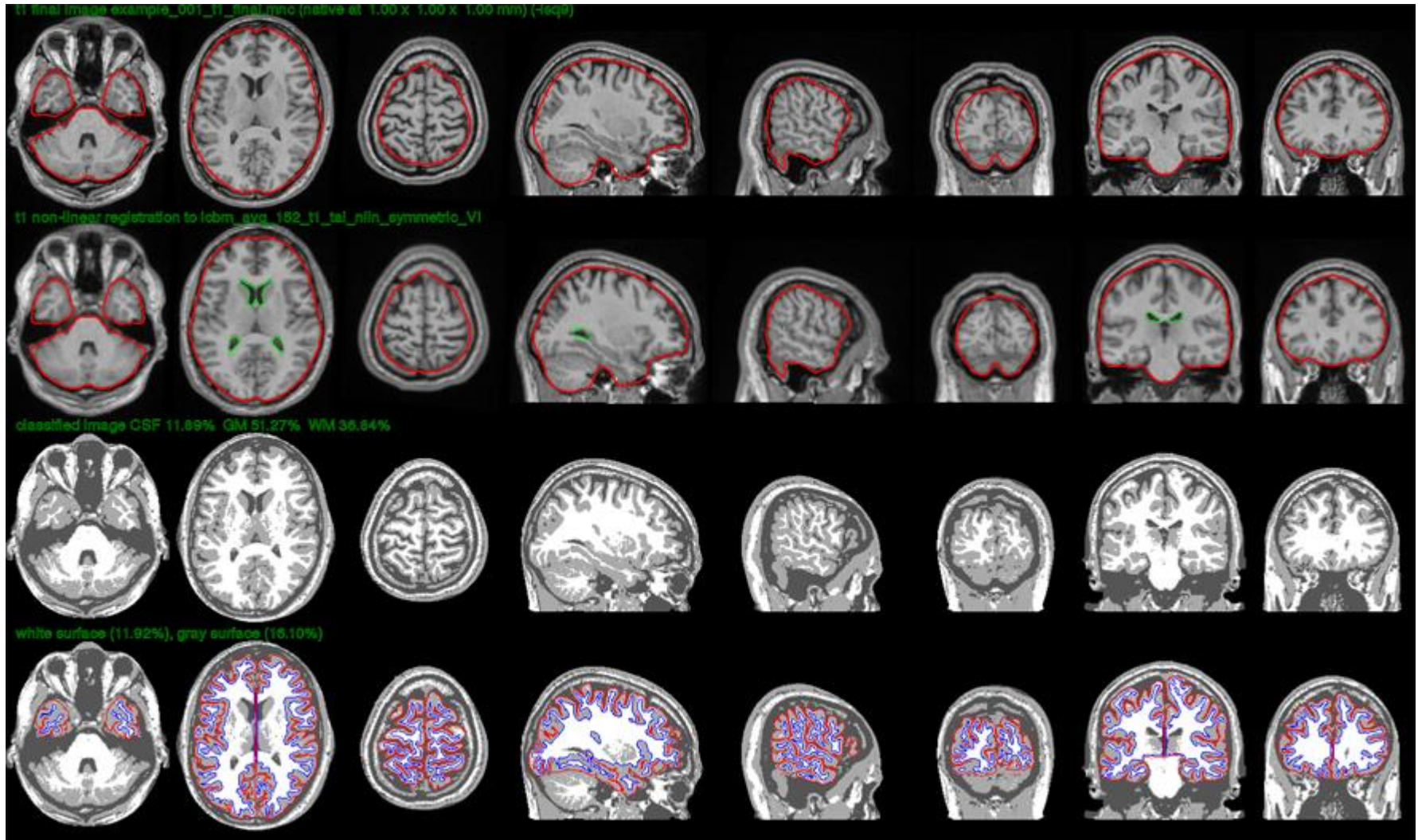


- Who is behind CIVET?
- What is CIVET?
- What's new in CIVET 2.0?
- Preparing your files for CIVET
- Running CIVET using the CBRAIN web-interface
- **How do I make sense of my output? (Quality Control)**
- Important Links

“Verify” QC Image:



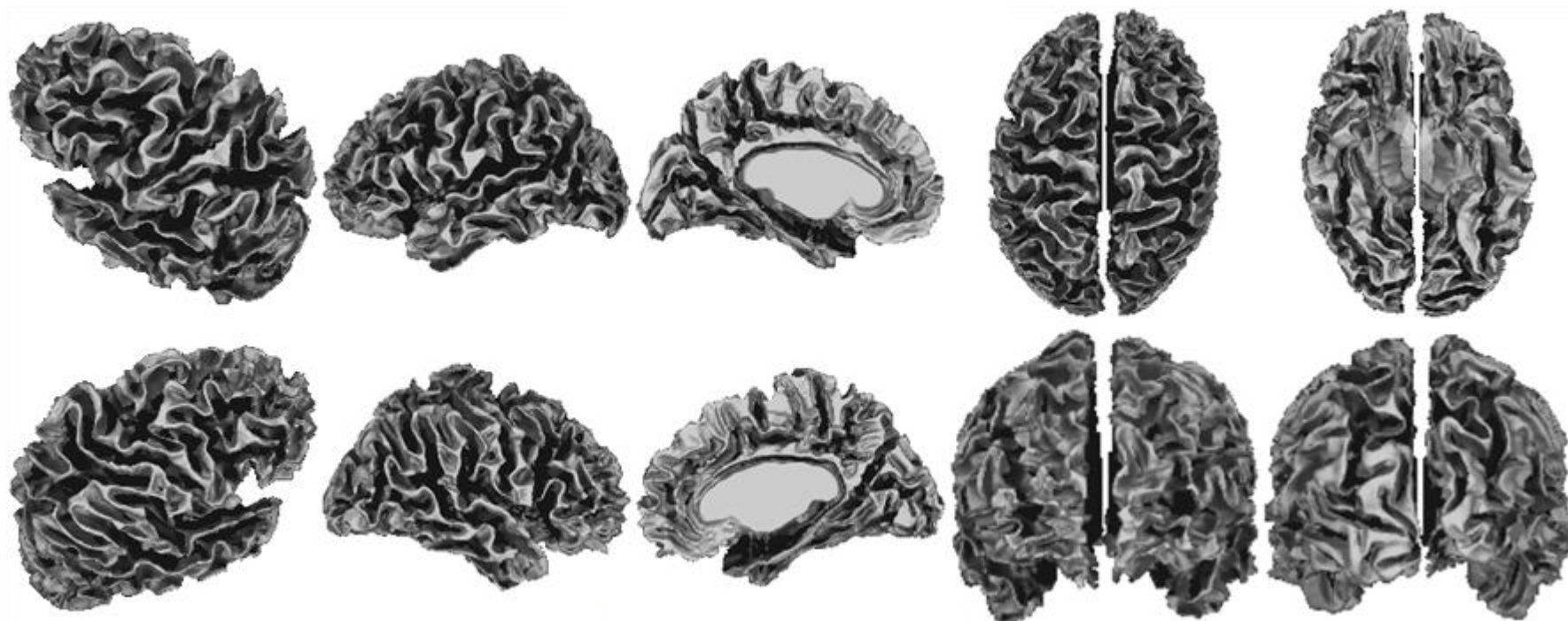
- Check mask, classified WM/GM, WM/GM surfs
- Tip: attention to temporal pole & meninges near central gyri



“Clasp” QC Image:



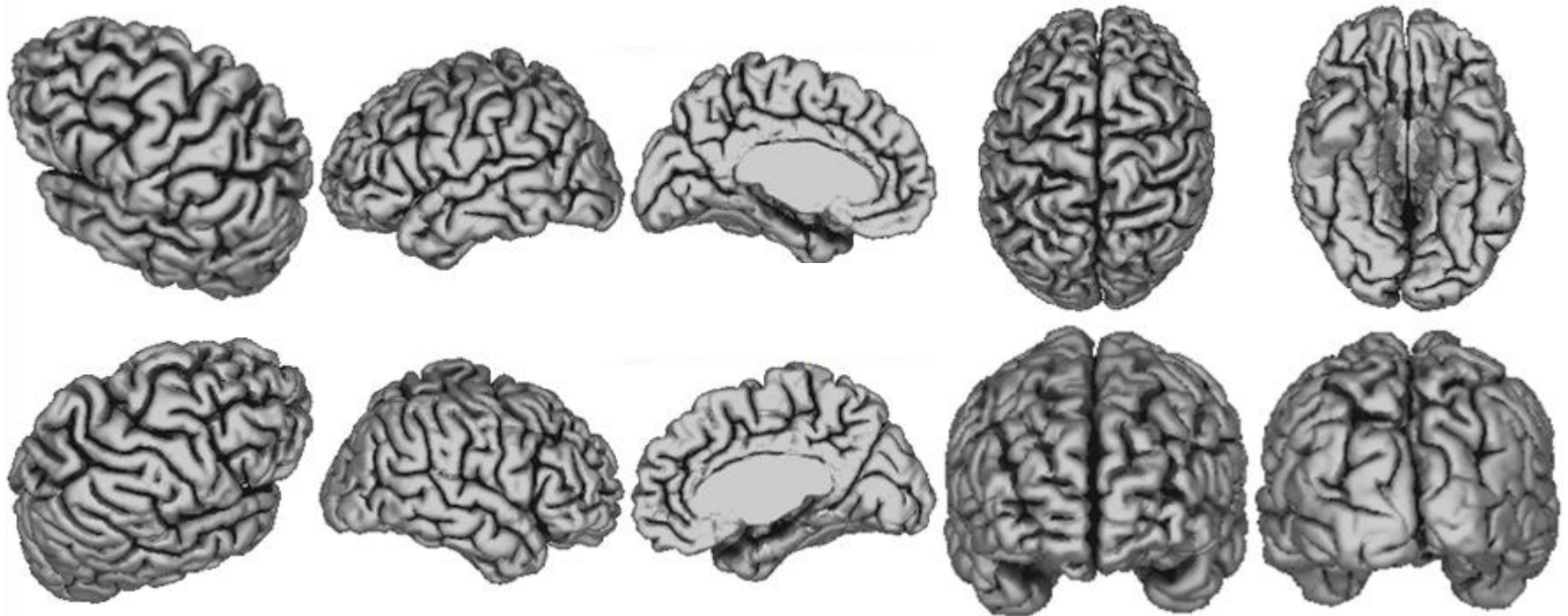
- Check white surface quality for:
 - masking errors (pieces of skull attached to white surf)
 - motion artifacts (white surf looks jagged with many bridges across gyri)



“Clasp” QC Image:



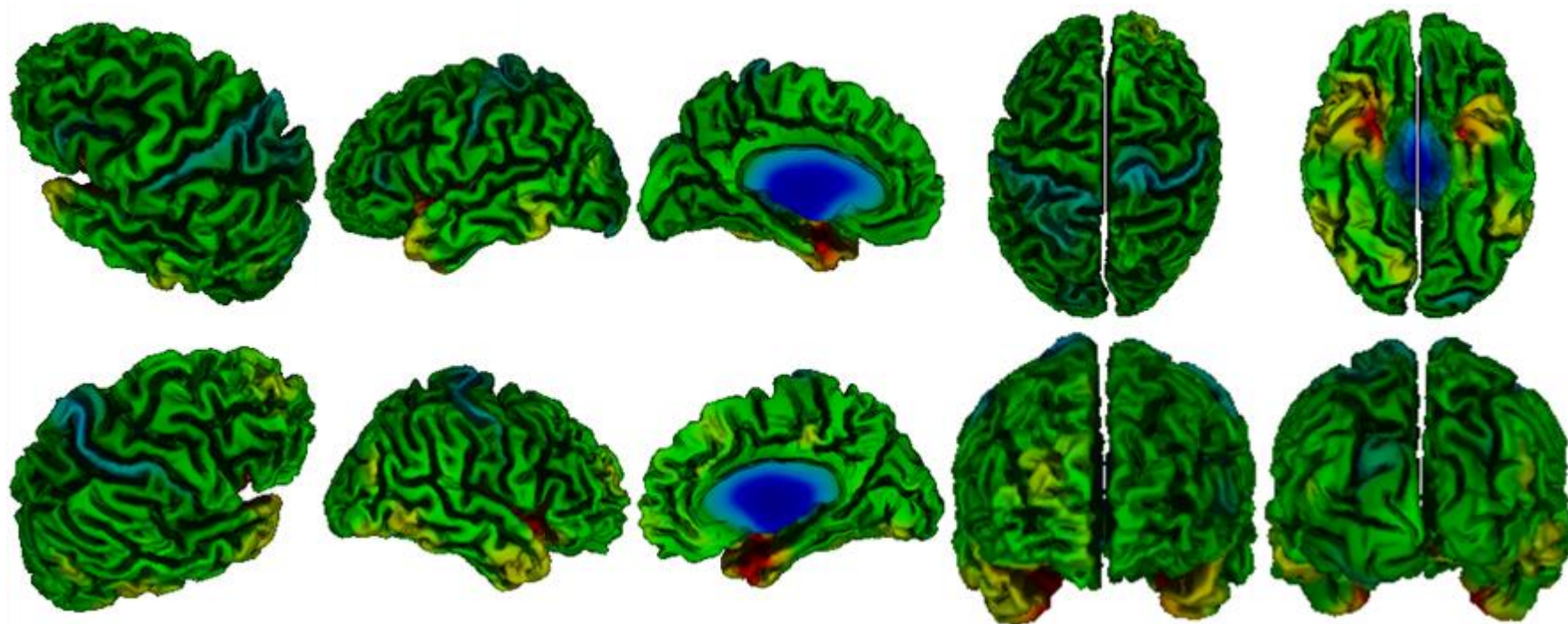
- Check gray surface quality for:
 - under-expansion of the gray surface (often in frontal and temporal lobes)



“Clasp” QC Image:



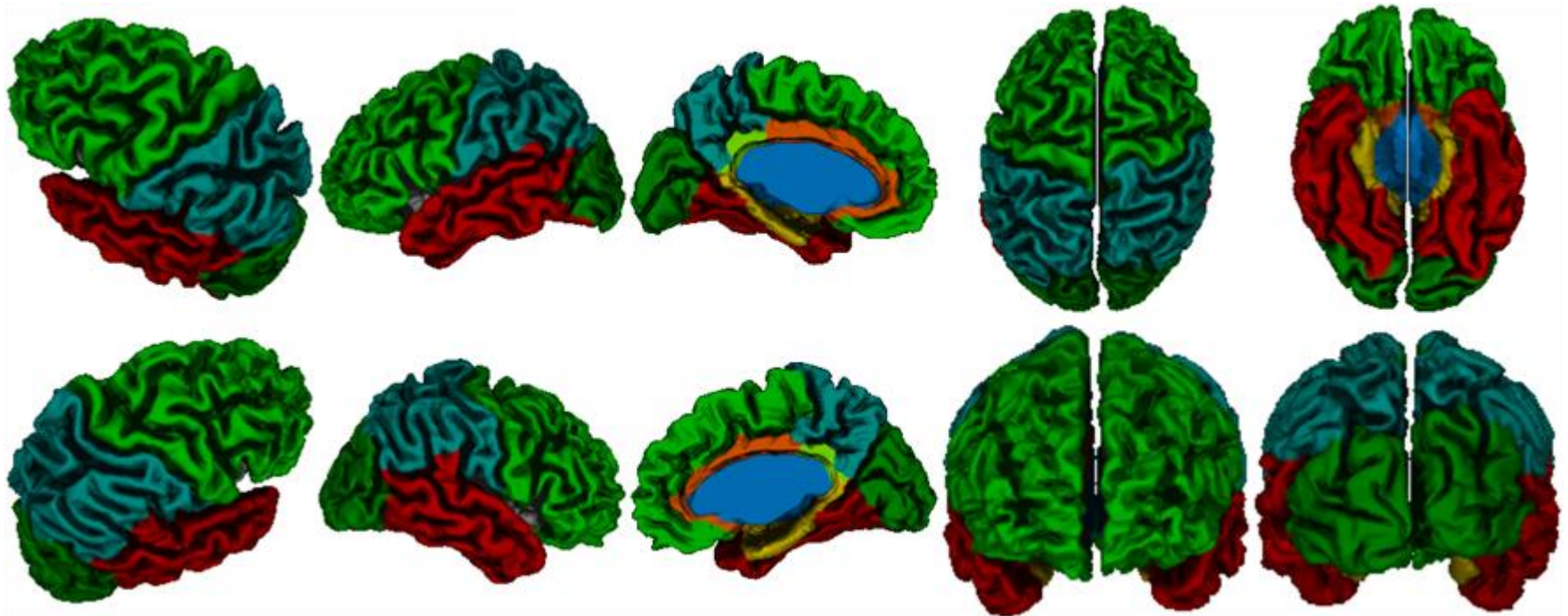
- Check cortical thickness maps for:
 - poor N3 correction of non-uniformities (atypical pattern of cortical thickness)
 - (spectral range, 0.5-5.5; hot colors = thicker values)



“Atlas” QC Image:



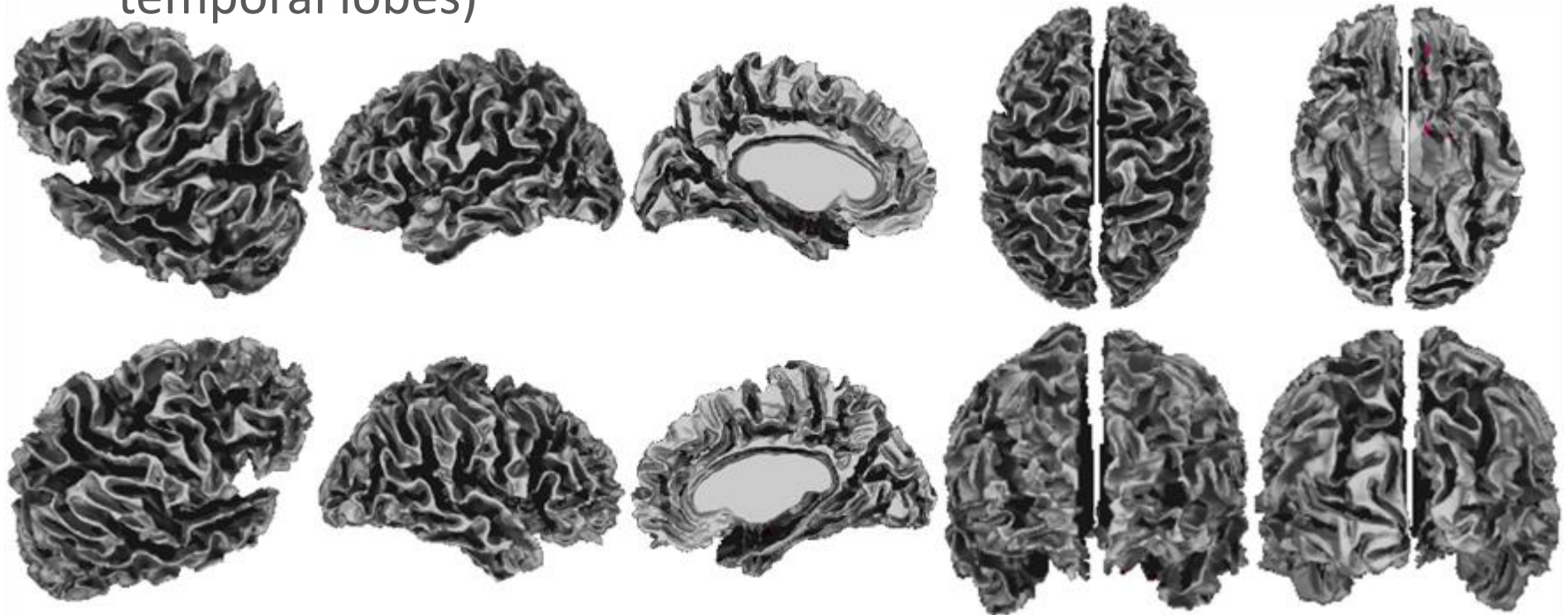
- Check surface registration quality:
 - Tip: pay special attention to the border of the frontal and parietal lobes at the central sulcus



Gray-White “Surf Surf Intersections” QC Image:



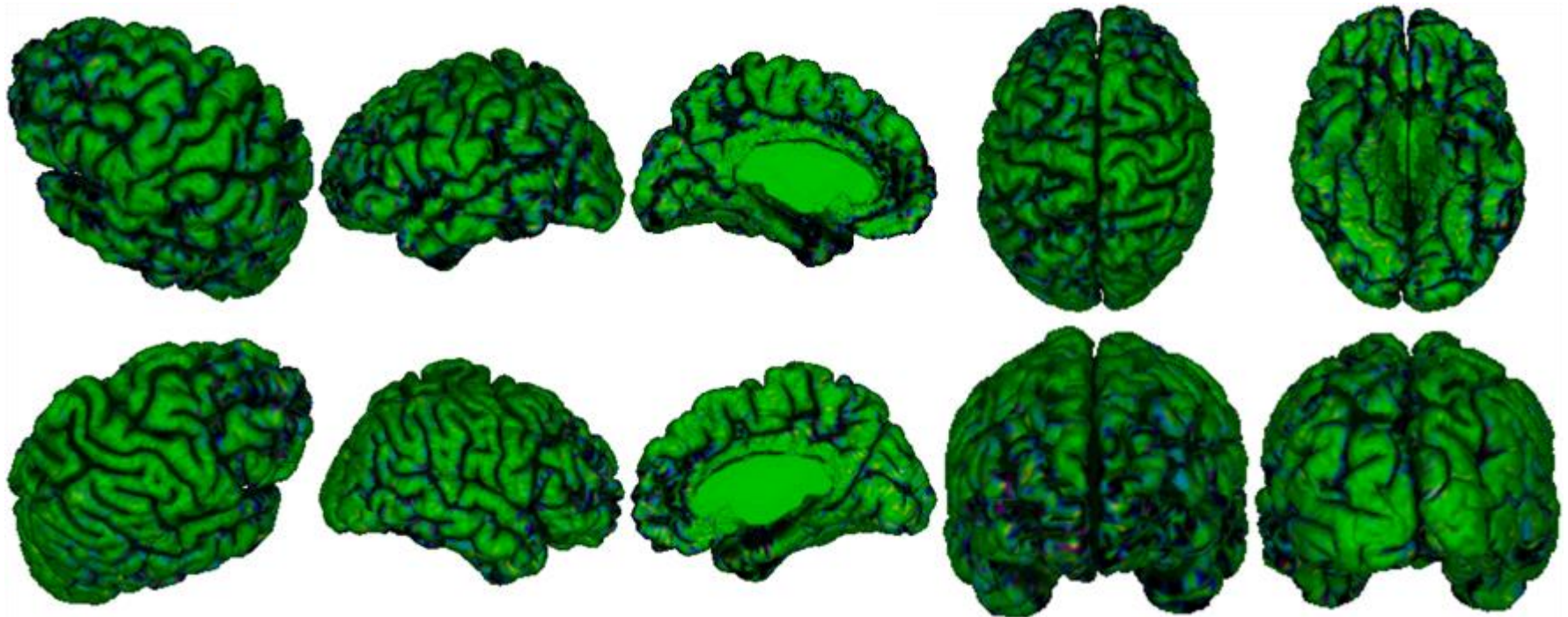
- Indicated by spots in pink, which may due to:
 - abnormally thin cortex (poor N3 correction of non-uniformities)
 - defects in white surface extraction (erroneous bridge across a sulcus cutting through cortex)
 - masking errors
 - tissue classification errors (often, broken thin strips of WM in temporal lobes)



“Laplacian” QC Image:

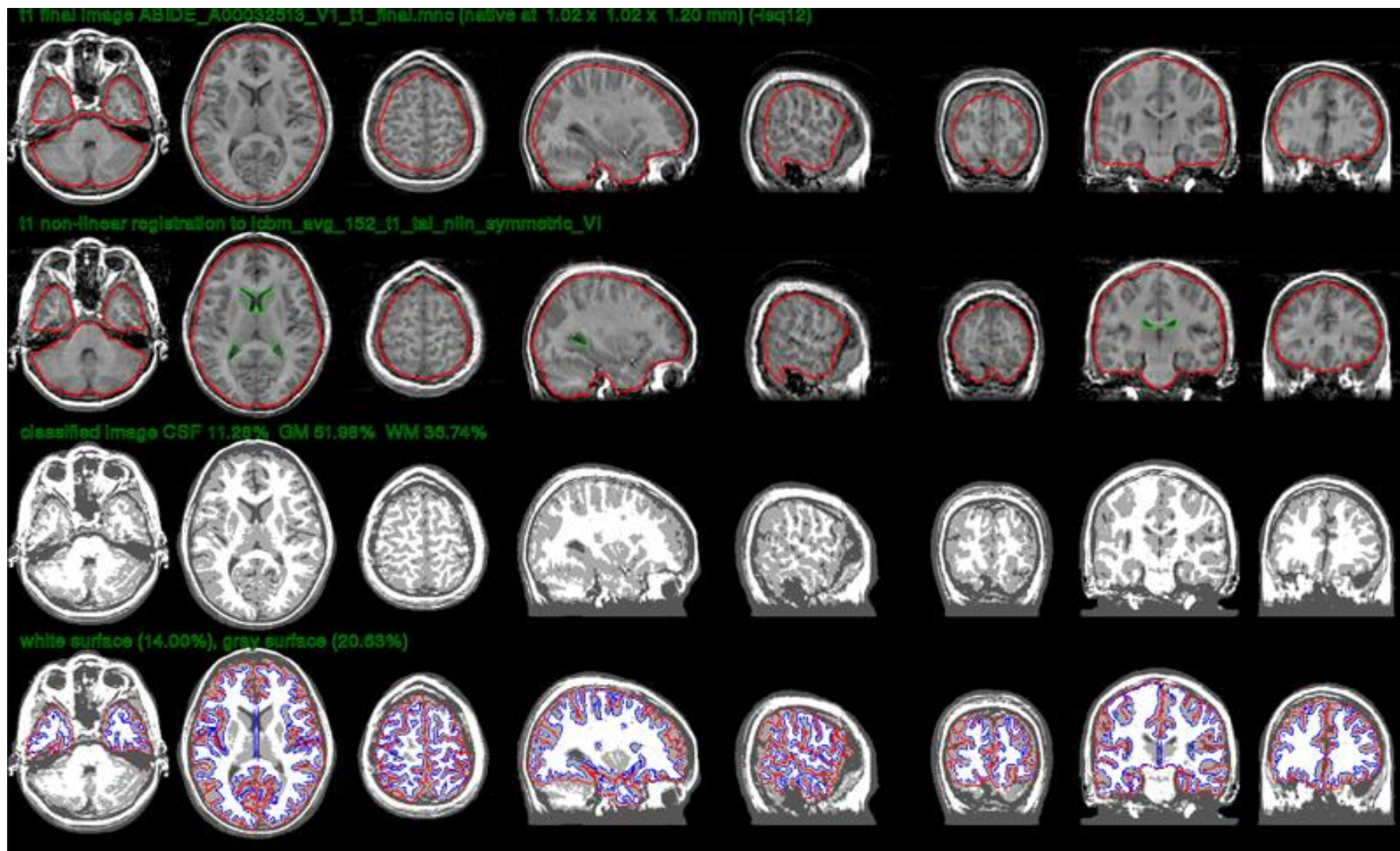


- A totally green image (Laplacian value of 10) indicates perfect convergence.
 - colours in high spectrum (red to white) indicate vertices outside the pial surface (over-expansion)
 - colours in the low spectrum (blue to black) indicate vertices inside the cortex (under-expansion).



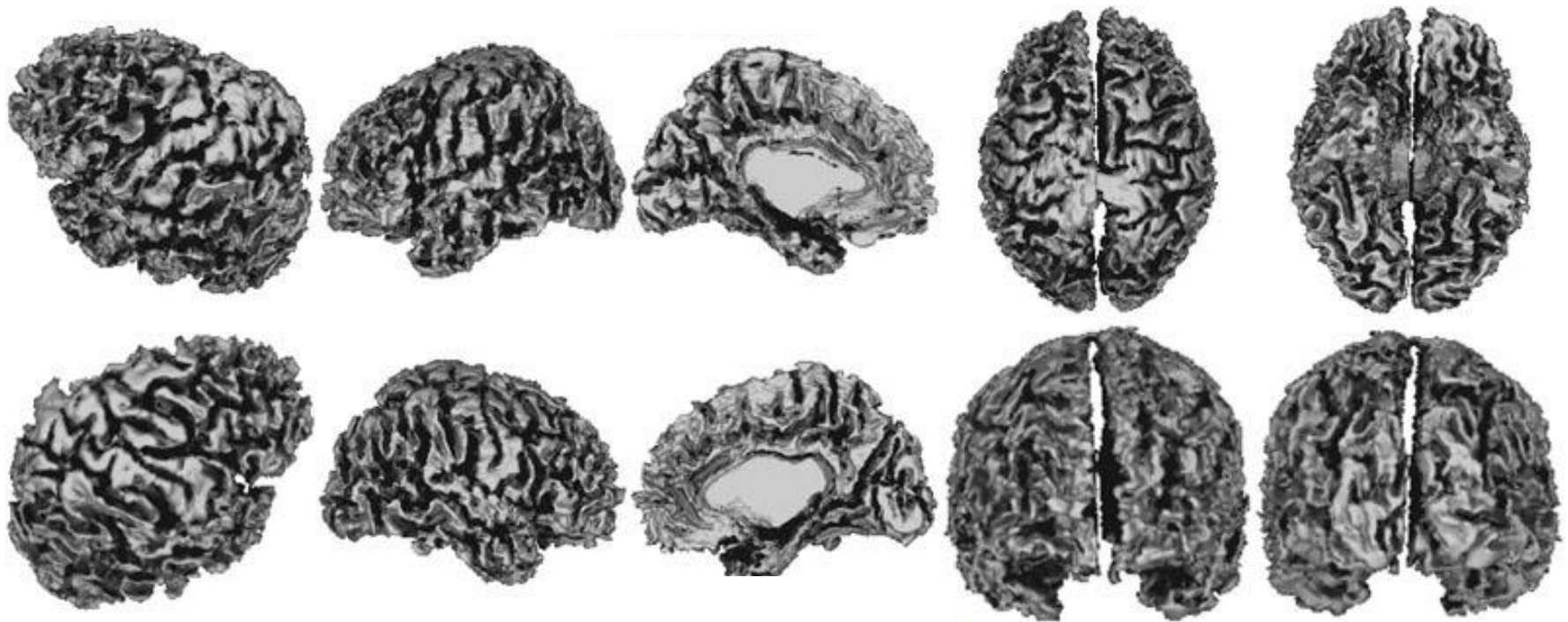
Examples of QC **FAILURE**: Motion Artifacts

- T1 images: Ripples or curved lines, often most evident in the coronal or horizontal views



Examples of QC **FAILURE**: Motion Artifacts

- Clasp images: White surfaces may be jagged, thick, and/or include skull or meninges



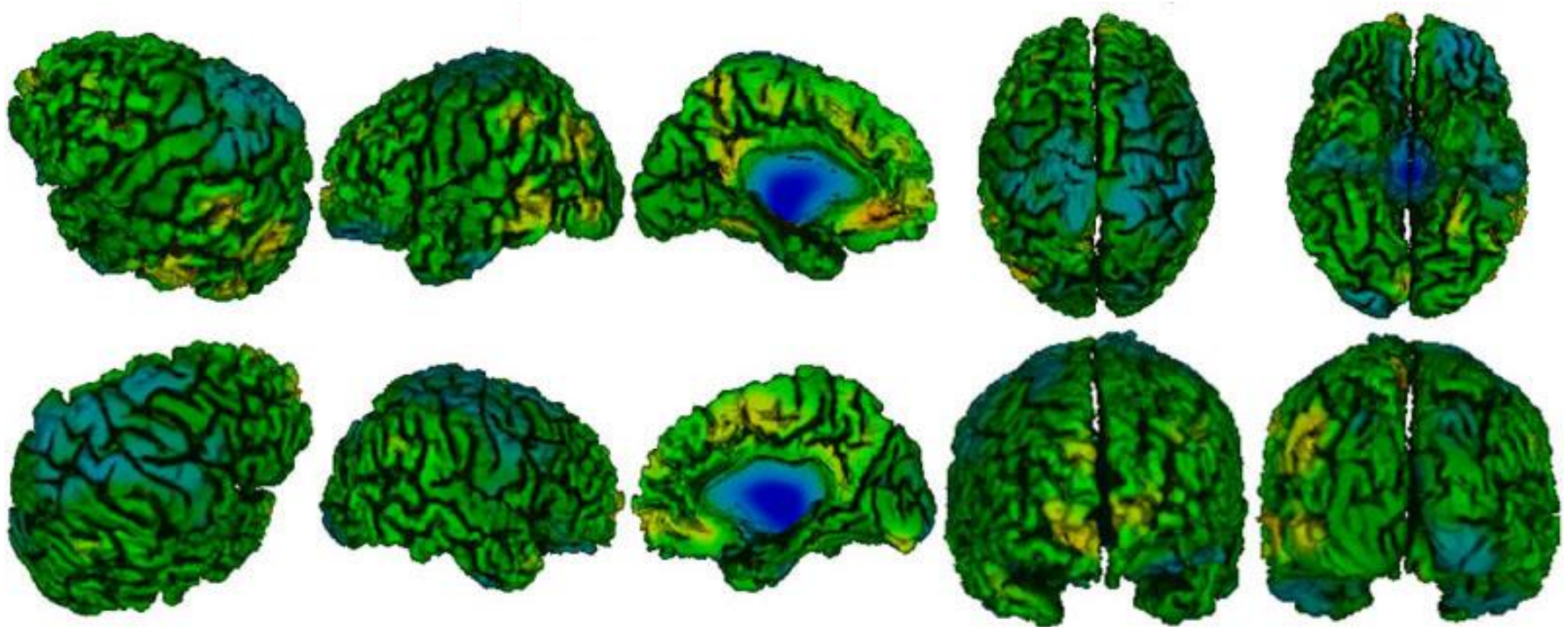
Examples of QC **FAILURE**: Motion Artifacts

- Clasp images: Gray surfaces may appear “puffy”



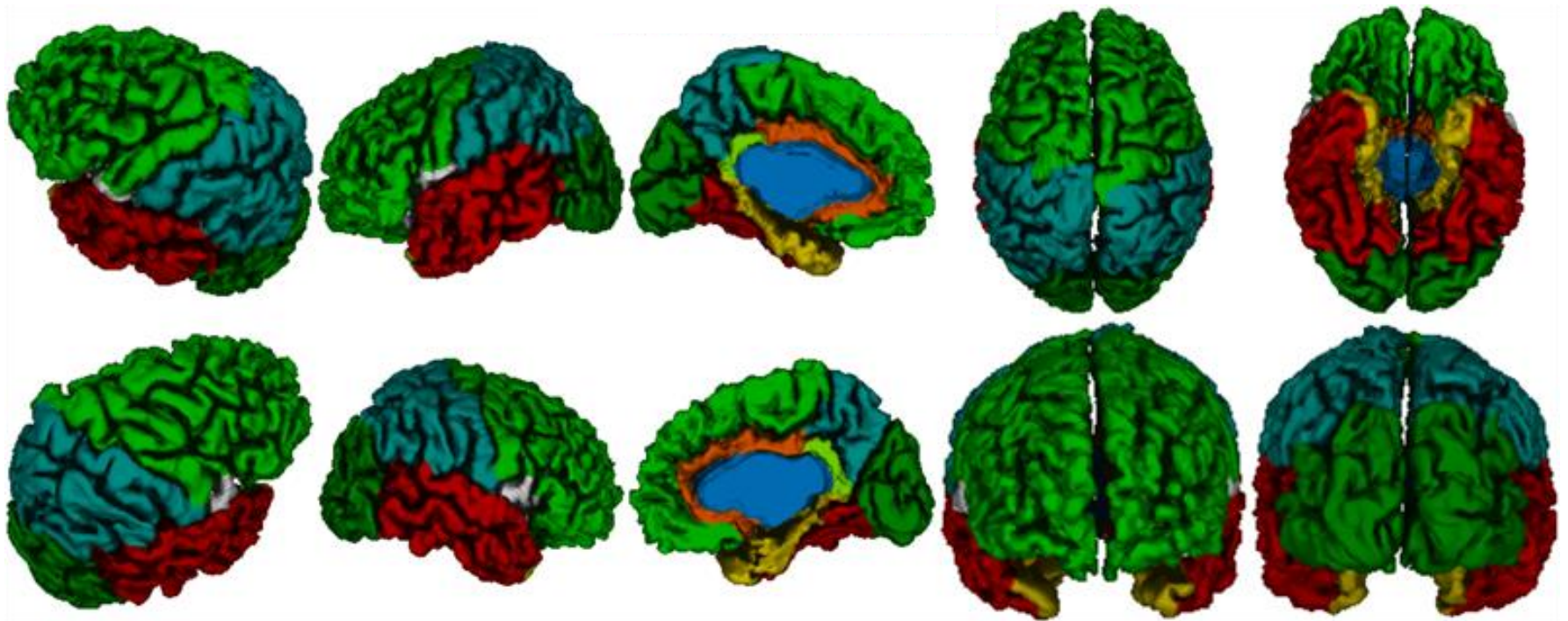
Examples of QC **FAILURE**: Motion Artifacts

- Cortical thickness maps: May be generally thin/blue, red spots, or other abnormal color variations



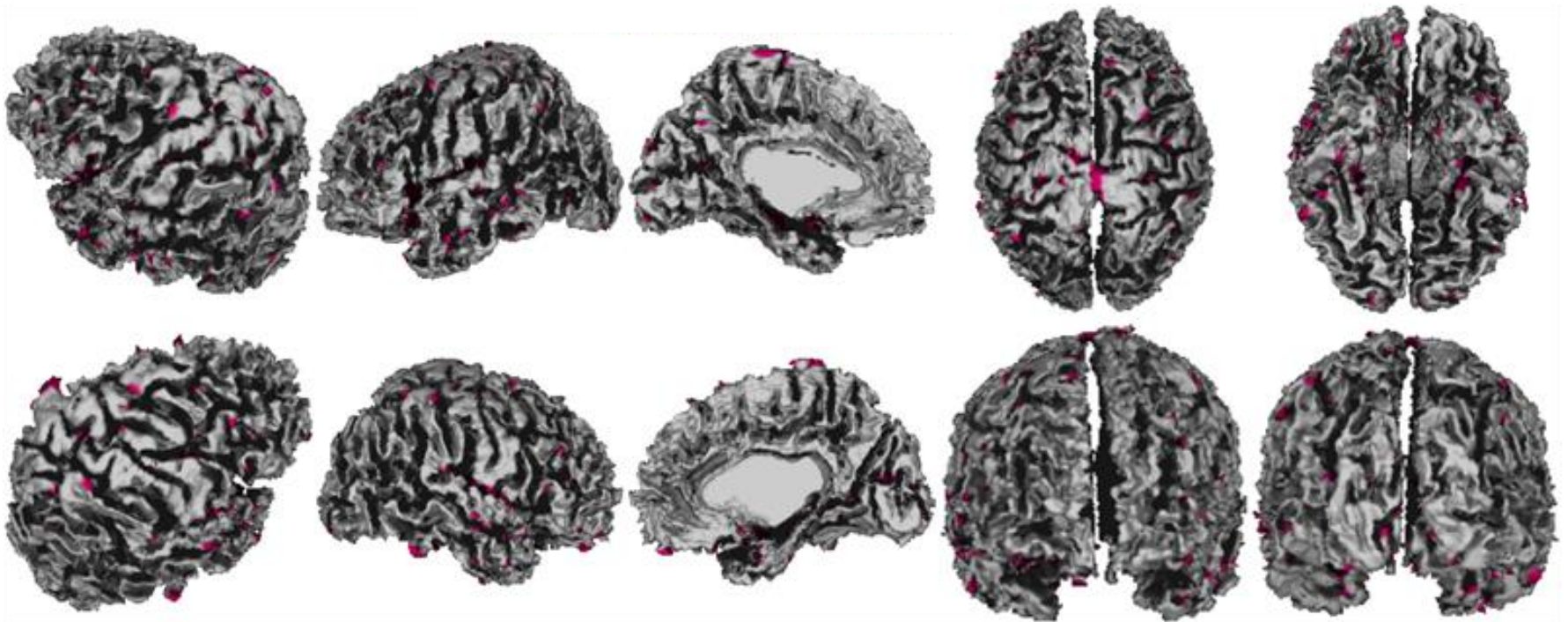
Examples of QC **FAILURE**: Motion Artifacts

- Surface registration: Check for errors, especially in the division between frontal and parietal lobes along the central sulcus



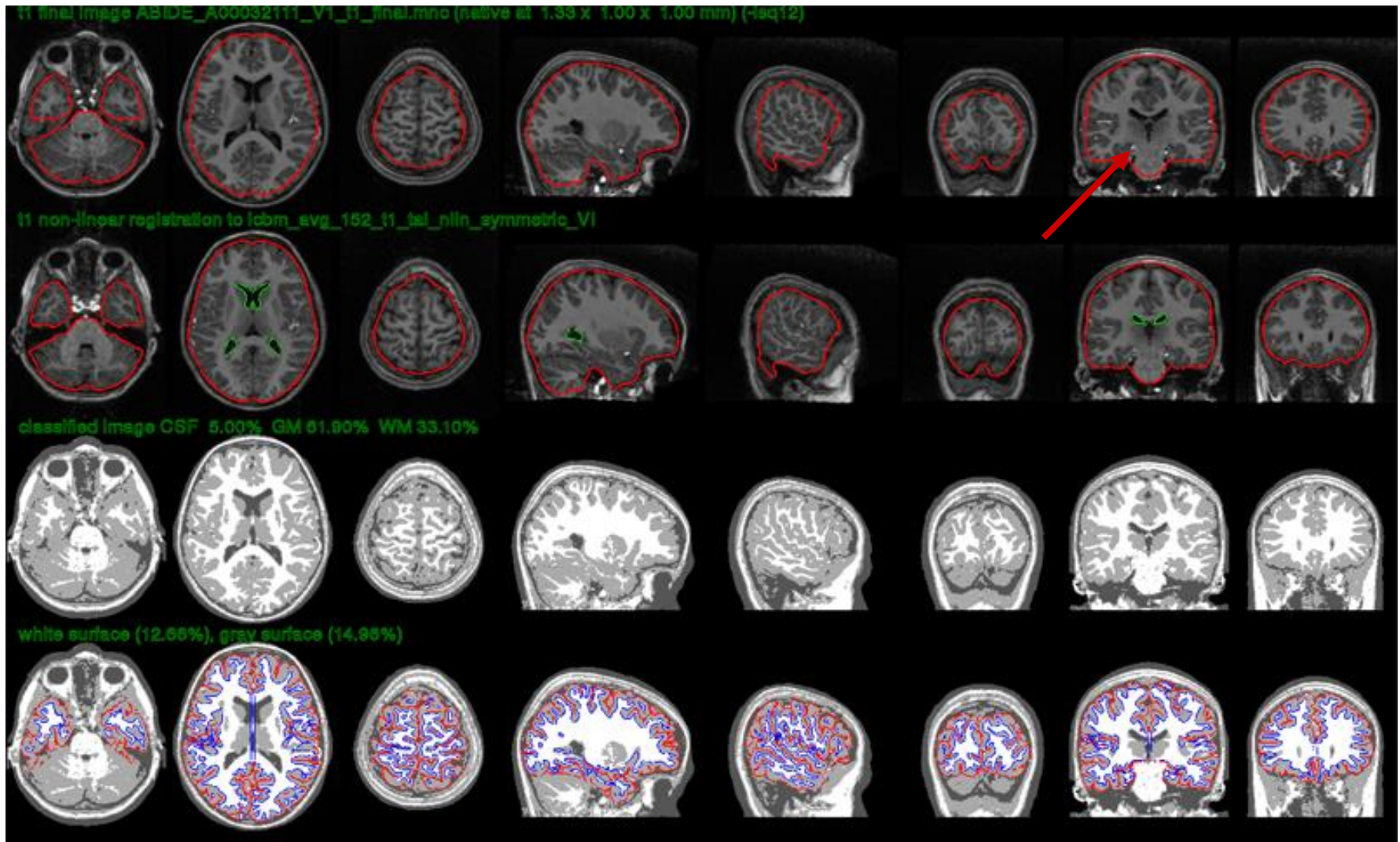
Examples of QC **FAILURE**: Motion Artifacts

- Surface surface intersections: There will likely generally be a high number (and high visibility) of surf-surf intersections, in pink



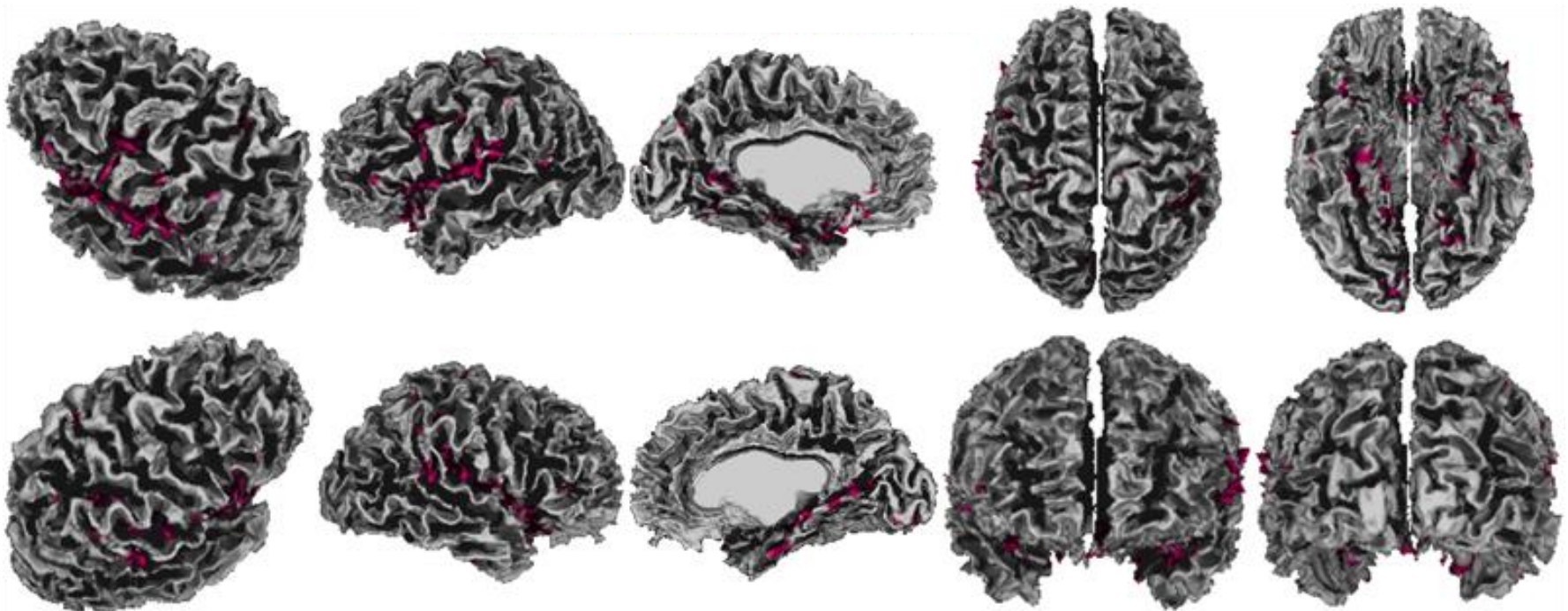
Examples of QC **FAILURE**: Blood Vessel Failure

- T1 images: Blood vessels appear as bright white spots



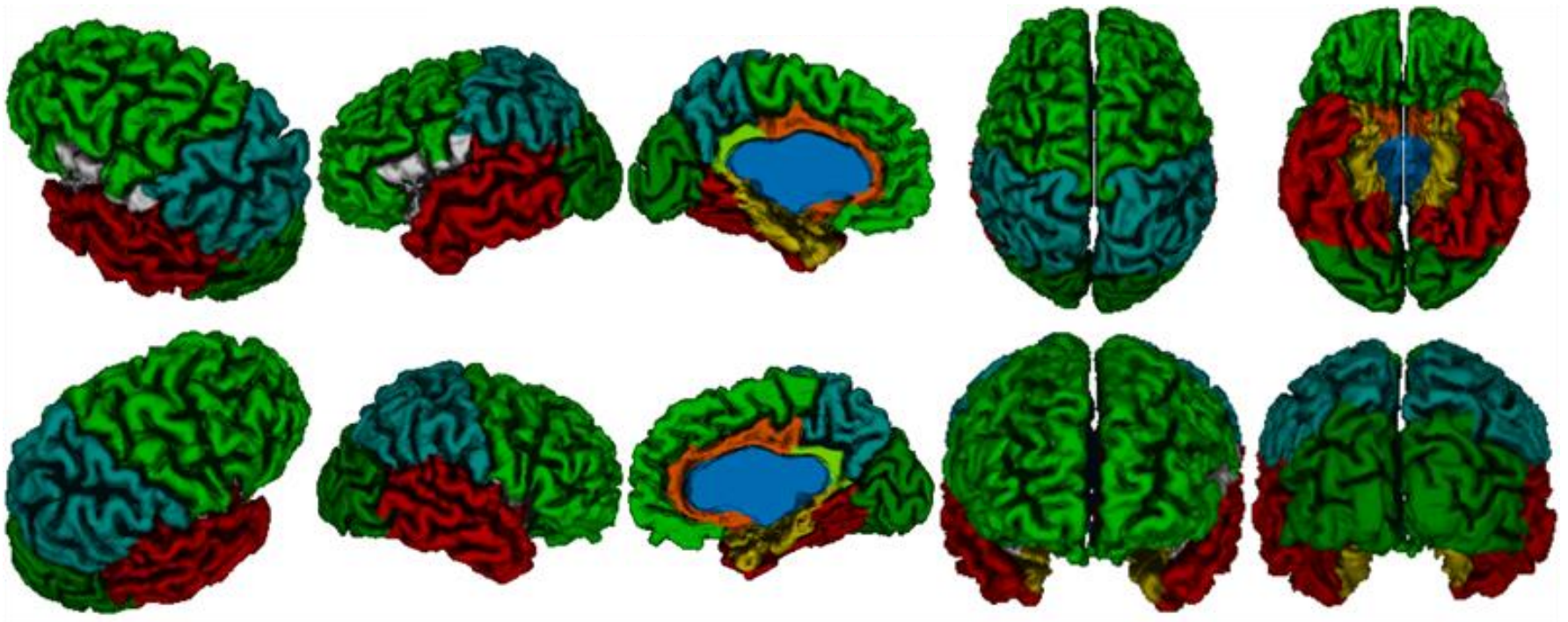
Examples of QC **FAILURE**: Blood Vessel Failure

- Surface surface intersections: There will likely generally be a high number (and high visibility) of surf-surf intersections, in pink, concentrated laterally
- Tip: to mask the blood vessels, rerun CIVET and use the option “Mask blood vessels”

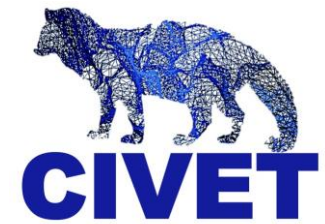


Examples of QC **FAILURE**: Blood Vessel Failure

- Surface registration: There may be errors, especially laterally



Scroll down to browse output directory contents:



File Listing

Civet Output

Change View

[Show Displayable Contents](#)

[Civet Directories Explained](#)

☐	File	Size
☐	 <u>CBRAIN_Mammouth-S-203491-1.params.yml</u>	737 bytes
☐	 <u>References.txt</u>	5.2 Kb
	 classify Expand	
	 final Expand	
	 logs Expand	
	 mask Expand	
	 native Expand	
	 surfaces Expand	
	 temp Expand	
	 thickness Expand	
	 transforms Expand	
	 verify Expand	

Extract Files from Collection

For more information on output:

<http://www.bic.mni.mcgill.ca/ServicesSoftware/OutputsOfCIVET>

Or view individual subjects' surfaces + maps:



File Listing

Civet Output Change View

Civet Output
Surface Viewer
Civet Directories Explained

☐	File	Size
☐	CBRAIN_Mammouth-S-203491-1.params.yml	737 bytes
☐	References.txt	5.2 Kb
	classify Expand	
	final Expand	
	logs Expand	
	mask Expand	
	native Expand	
	surfaces Expand	
	temp Expand	
	thickness Expand	
	transforms Expand	
	verify Expand	

Extract Files from Collection

Drop down to “Surface Viewer” to examine surfaces in BrainBrowser

Or view individual subjects' surfaces + maps:



File Listing

Surface Viewer ▾

Change View

[Show Displayable Contents](#)
[Civet Directories Explained](#)

☐	File	Size
☐	 CBRAIN_Mammouth-S-203491-1.params.yml	737 bytes
☐	 References.txt	5.2 Kb
	 classify Expand	
	 final Expand	
	 logs Expand	
	 mask Expand	
	 native Expand	
	 surfaces Expand	
	 temp Expand	
	 thickness Expand	
	 transforms Expand	
	 verify Expand	

Extract Files from Collection

“Change View”

Content

Surface Viewer

Change View



Files:

Surface File:

Thickness File:

Color Bar:



Surface + thickness overlay can be rotated and inspected with your mouse, in the browser!

Or view entire QC collection:



File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - Files

Files Tasks

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(7 files)

Search by name:

☐	Filename ▼	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
☐	example_001_t1.mnc ✓	Minc File	Ilewis	2014-02-27	10.7 Mb		Read Only	MainStore
☐	001-Mammouth-S-203491-1 ✓	Civet Output	Ilewis	2014-02-27	203.7 Mb (226 files)		Read Only	MainStore
☐	example_002_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	002-Mammouth-S-203492-1 ✓	Civet Output	Ilewis	2014-02-27	203.9 Mb (226 files)		Read Only	MainStore
☐	example_003_t1.mnc ✓	Minc File	Ilewis	2014-02-27	11.0 Mb		Read Only	MainStore
☐	003-Mammouth-S-203493-1 ✓	Civet Output	Ilewis	2014-02-27	205.0 Mb (226 files)		Read Only	MainStore
☐	Example_MC_QC ✓✓	Civet Study	Ilewis	2014-02-27	612.7 Mb (699 files)		Read Only	MainStore

Synchronization symbols: ✓: InSync * : ProvNewer ⚡ : CacheNewer ✗ : Corrupted ↓ : ToCache ↑ : ToProvider

Click on “Show QC Data” to see QC Table + Plots



File Edit View History Bookmarks Tools Help

CBRAIN - File Info

https://portal.cbrain.mcgill.ca/userfiles/296152

My Account Projects Messages Resources Email Support Rev: 3.1.12-51

CBRAIN - Example - MC - File Info

Files Tasks

Delete Download Collection

Info [\(Edit\)](#)

Name:	Example_MC_QC	Created at:	2014-02-27 21:12:48 EST (5 days, 15 hours and 7 minutes)
Type:	Civet Study	Modified at:	2014-02-27 21:14:36 EST (5 days, 15 hours and 6 minutes)
Size:	612.7 Mb (699 files) = 612719180 bytes	Data Provider:	MainStore (EnCbrainSmartDataProvider) Cached: ✓ ✓
Owner:	llewis	Project:	Example - MC
Tags:		Project permission on file:	Read
Hidden file:	☐ H	Immutable file:	☐ I

<< Previous File

Content

Civet Study

Show QC Data
Civet QC Legend

Click on subject # for QC images

QC

No.	ID	x-step	y-step	z-step	StxMaskErr	CSFcls	GMcls	WMcls	GMCortical	WMsurf	GMsurf	SRLeft	SRRight	SSLeft	SSRight
1	001	1.00	1.00	1.00	9.72	11.89	51.27	36.84	533.68107	12.11	16.91	41	31	0	0
2	002	1.00	1.00	1.00	9.59	11.59	50.75	37.66	538.7871	12.64	15.08	2	20	0	0
3	003	1.00	1.00	1.00	9.59	11.67	49.71	38.61	520.97988	15.22	17.26	14	4	0	0
Mean					9.633	11.72	50.58	37.70	531.15	13.32	16.42	19.00	18.33	0.00	0.00
StdDev					0.064	0.13	0.65	0.72	7.49	1.36	0.96	16.31	11.09	0.00	0.00

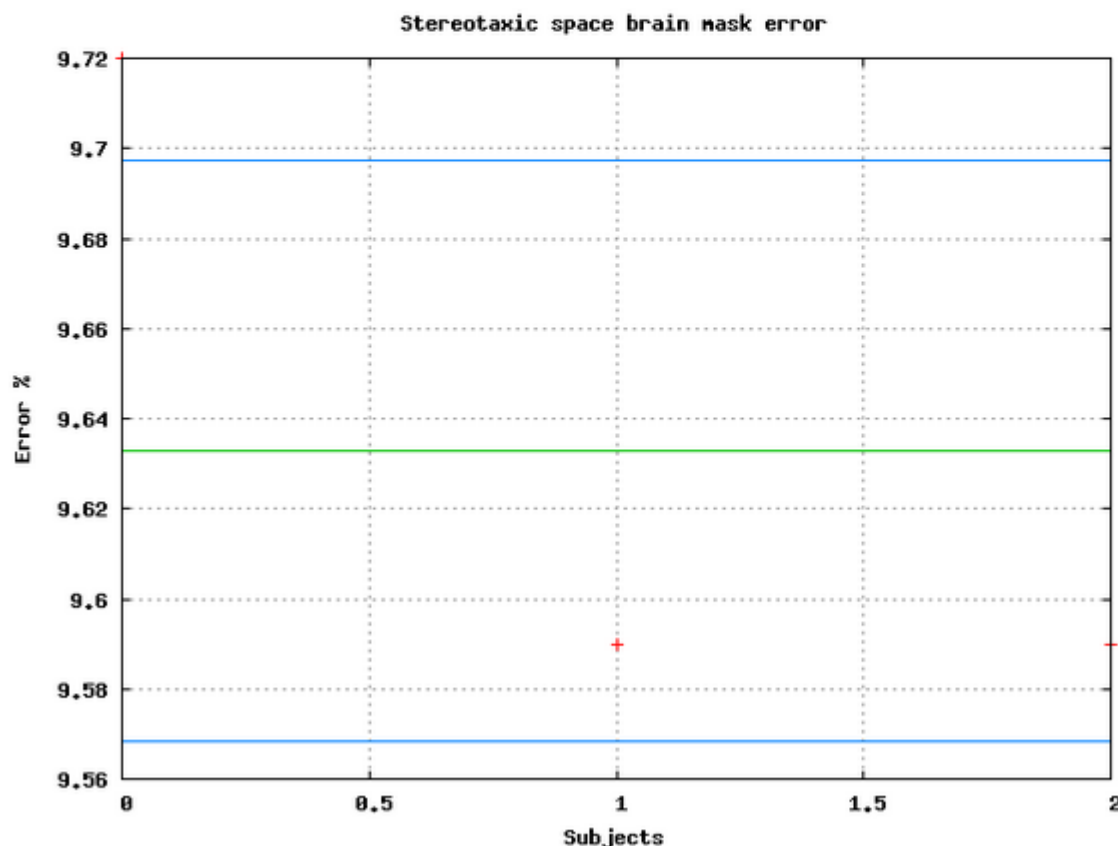


Figure 1: Error between stereotaxic space brain mask and the brain mask of the stereotaxic model.

Green line is the mean; blue lines are mean +/- 1 stddev.

Scroll down for more plots



Download your data via SFTP:



- Checkbox all output, click “File Management”

The screenshot shows the CBRAIN web interface. The browser address bar displays <https://portal.cbrain.mcgill.ca/userfiles>. The page title is "CBRAIN - Example_MC - Files". The navigation bar includes links for "My Account", "Projects", "Messages", "Resources", "Email Support", and "Rev: 3.1.12-67". The main content area has tabs for "Files" and "Tasks". Below the tabs, there are several action buttons: "Upload File", "Launch Task", "File Management", "Update Attributes", "Selected Files", "Filters", and "View Options". The "File Management" dropdown menu is open, showing options for "Download", "Move/Copy", "Create collection", and "Compression, archiving and deletion". The "Download" section has a text input for "Specify Download File Name (optional):" and a "Download Files" button. The "Move/Copy" section has a "To Data Provider:" dropdown set to "(Select Destination)", an "Overwrite files on Destination, if they exist:" checkbox, and "Move Files" and "Copy Files" buttons. The "Create collection" section has a "Name for the collection (optionnal):" text input, a "To Data Provider:" dropdown set to "(Select Destination)", and a "Create Collection" button. The "Compression, archiving and deletion" section has buttons for "(Un)compress", "(Un)archive", and "Delete". On the left, a file list table shows files with checkboxes. The file "Example_MC_QC" is selected, indicated by a red arrow. The file list includes columns for checkboxes, file names, and synchronization symbols.

☐	Filename	
☐	example_001_t1.mnc ✓	
☒	001-Mammouth-S-203	
☐	example_002_t1.mnc ✓	
☒	002-Mammouth-S-203	
☐	example_003_t1.mnc ✓	
☒	003-Mammouth-S-203	
☒	Example_MC_QC ✓ ✓	

Powered by CBRAIN
[Feedback](#) [Credits](#)

Download your data via SFTP:



- Select “SFTP-Brainstorm” from drop-down menu
- Click “Move Files”

File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Files

Files Tasks

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

Download

Specify Download File Name (optional): [Download Files](#)

Move/Copy

To Data Provider: (Select Destination) Overwrite files on Destination, if they exist: ☐ [Move Files](#) [Copy Files](#)

Create collection

Name for the collection: To Data Provider: (Select Destination) [Create Collection](#)

Compression, archive, and delete

For file(s): (Un)archive For any type: [Delete](#)

File List:

Filename
☐ example_001_t1.mnc ✓
☒ 001-Mammouth-S-203 ✓
☐ example_002_t1.mnc ✓
☒ 002-Mammouth-S-203 ✓
☐ example_003_t1.mnc ✓
☒ 003-Mammouth-S-203 ✓
☒ Example_MC_OC ✓ ✓

Synchronization symbols

Powered by CBRAIN
[Feedback](#) [Credits](#)

Move/Copy Dropdown Menu:

- (Select Destination)
- (Select Destination)
- CBRAIN Official Storage
 - MainStore
 - MindStore
 - User-Archive
 - WorkdirSystemArchive
 - WorkdirSystemArchive2
- User Storage
 - SFTP-Brainstorm
 - SFTP-Incoming

Download your data via SFTP:



- We use SFTP options as before,
but in the opposite direction:
- You can use an SFTP client (e.g., Filezilla) to drag / drop files from
Brainstorm to your computer

OR

- You can use command-line SFTP
 - `cd <dir_name_containing_mnc_files>`
 - `sftp -oPort=7500 <username>@brainstorm.cbrain.mcgill.ca`
 - `get *.mnc`

Don't forget to delete your data off the SFTP server:



- Click on “Resources,” drop-down to “Data Providers”

File Edit View History Bookmarks Tools Help

CBRAIN - Files

https://portal.cbrain.mcgill.ca/userfiles

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example

Files Tasks

Data Providers Servers Tools

Files copied to SFTP-Brainstorm System 2014-03-17 07:40:58 EDT

Upload File Launch Task File Management Update Attributes Selected Files Filters View Options

(11 files) Search by name:

	Filename	File Type	Owner	Creation Date	Size	Tags	Project Access	Provider
☐	example_001_t1.mnc ✓	Minc File	llewis	2014-03-12	10.7 Mb		Read Only	MainStore
☐	001-Mammouth-S-203491-1	Civet Output	llewis	2014-03-12	198.9 Mb (223 files)		Read Only	MainStore
☐	001-Mammouth-S-203491-1	Civet Output	llewis	2014-03-17	198.9 Mb (223 files)		Read Only	SFTP-Brainstorm
☐	example_002_t1.mnc ✓	Minc File	llewis	2014-03-12	11.0 Mb		Read Only	MainStore
☐	002-Mammouth-S-203492-1	Civet Output	llewis	2014-03-12	199.2 Mb (223 files)		Read Only	MainStore
☐	002-Mammouth-S-203492-1	Civet Output	llewis	2014-03-17	199.2 Mb (223 files)		Read Only	SFTP-Brainstorm
☐	example_003_t1.mnc ✓	Minc File	llewis	2014-03-12	11.0 Mb		Read Only	MainStore
☐	003-Mammouth-S-203493-1	Civet Output	llewis	2014-03-12	199.9 Mb (223 files)		Read Only	MainStore
☐	003-Mammouth-S-203493-1	Civet Output	llewis	2014-03-17	199.9 Mb (223 files)		Read Only	SFTP-Brainstorm

Don't forget to delete your data off the SFTP server:



- Click “Browse” to the right of your Data Provider

File Edit View History Bookmarks Tools Help

CBRAIN - Data Providers

https://portal.cbrain.mcgill.ca/data_providers

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Data Providers

Files Tasks

Show Details User Access Report Transfer Restrictions Report Disk Usage Report Help

Official Data Storage

Provider Name ▼	• Project	Online?	Alive?	Files	Mode	Operations
MainStore	everyone	Yes	Yes	1224	Read/Write	
MindStore	everyone	Yes	Yes	34	Read/Write	
User-Archive	everyone	Yes	Yes	0	Read/Write	
WorkdirSystemArchive	everyone	Yes	Yes	113	Read/Write	
WorkdirSystemArchive2	everyone	Yes	Yes	0	Read/Write	

User or Site Storage

Provider Name ▼	• Project	Online?	Alive?	Files	Mode	Operations
BigBrain-Volumes	BigBrain-Distribution	Yes	Yes	0	Read Only	Browse
SFTP-Brainstorm	everyone	Yes	Yes	4	Read/Write	Browse
SFTP-Incoming	everyone	Yes	Yes	0	Read/Write	Browse

Don't forget to delete your data off the SFTP server:



- Checkbox all, click “Delete”

File Edit View History Bookmarks Tools Help

CBRAIN - Browse Data Provider

https://portal.cbrain.mcgill.ca/data_providers/51/browse

My Account Projects Messages Resources Email Support Rev: 3.1.12-67

CBRAIN - Example_MC - Browse Data Provider

Files Tasks

Register Files Unregister Files **Delete Files** View Options

This panel allows you to **delete permanently** files that are present on the remote Data Provider. Note that this operation will work whether or not the files are registered. If they are registered, they will be unregistered first.

Delete the files!

Files Available On Remote

☒	Name	Size	Type	Last modified	Registered?	Note
☒	001-Mammouth-S-203491-1-		CivetOutput	2014-03-12 22:58:30 EDT	Registered	
☒	002-Mammouth-S-203492-1-		CivetOutput	2014-03-12 22:58:25 EDT	Registered	
☒	003-Mammouth-S-203493-1-		CivetOutput	2014-03-12 22:55:12 EDT	Registered	
☒	Example_MC_QC	-	CivetStudy	2014-03-12 23:00:12 EDT	Registered	

Important note about the behavior of this Data Provider: Files registered on the Data Provider will only be **unregistered** if the **Delete** button of the file manager is used. Please use the **Delete Files** panel above to remove them completely.

Once downloaded, use Display to view surfaces overlaid on T1's

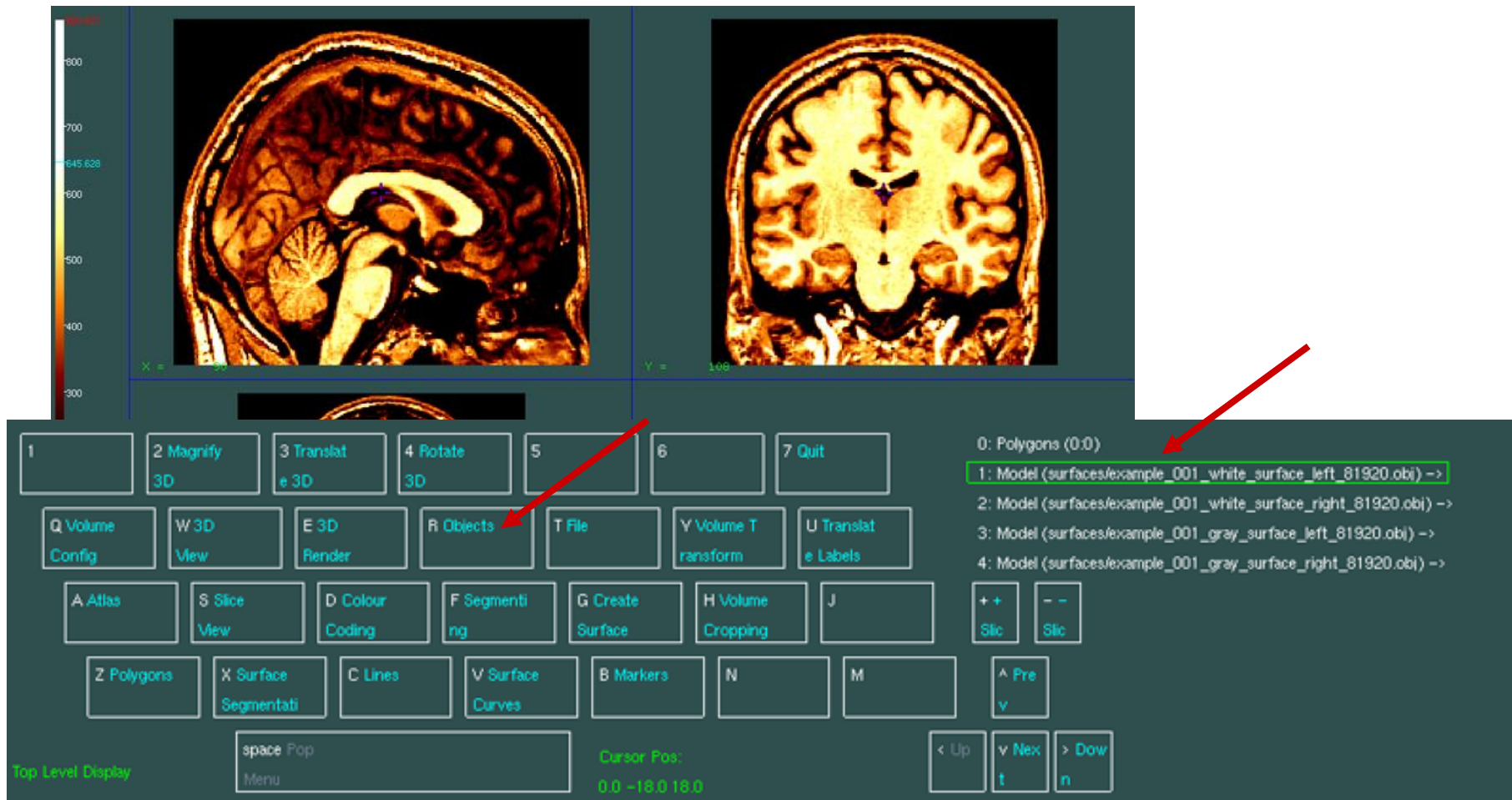


- `cd <dir_name_containing_CIVET_output>`
- `cd <prefix>_<id>`
- `Display <T1> <list of surface overlays>`
 - `Display final/<prefix>_<id>_t1_final.mnc ...`
 - `surfaces/<prefix>_<id>_white_surface_left_81920.obj ...`
 - `surfaces/<prefix>_<id>_white_surface_right_81920.obj ...`
 - `surfaces/<prefix>_<id>_gray_surface_left_81920.obj ...`
 - `surfaces/<prefix>_<id>_gray_surface_right_81920.obj`

Once downloaded, use Display to view surfaces overlaid on T1's



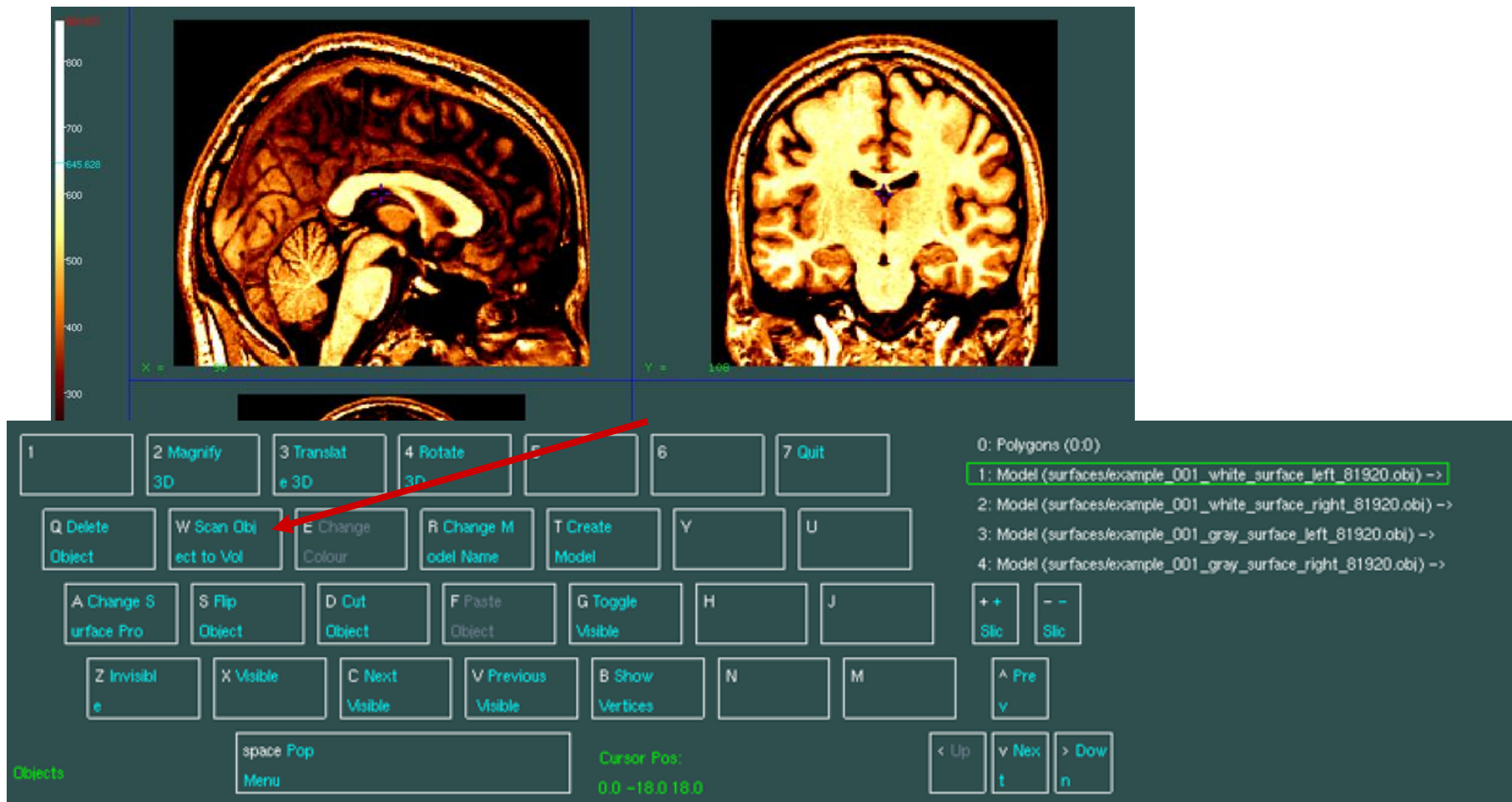
- Press “Up” key to select white left surf
- Click “Objects”



Once downloaded, use Display to view surfaces overlaid on T1's



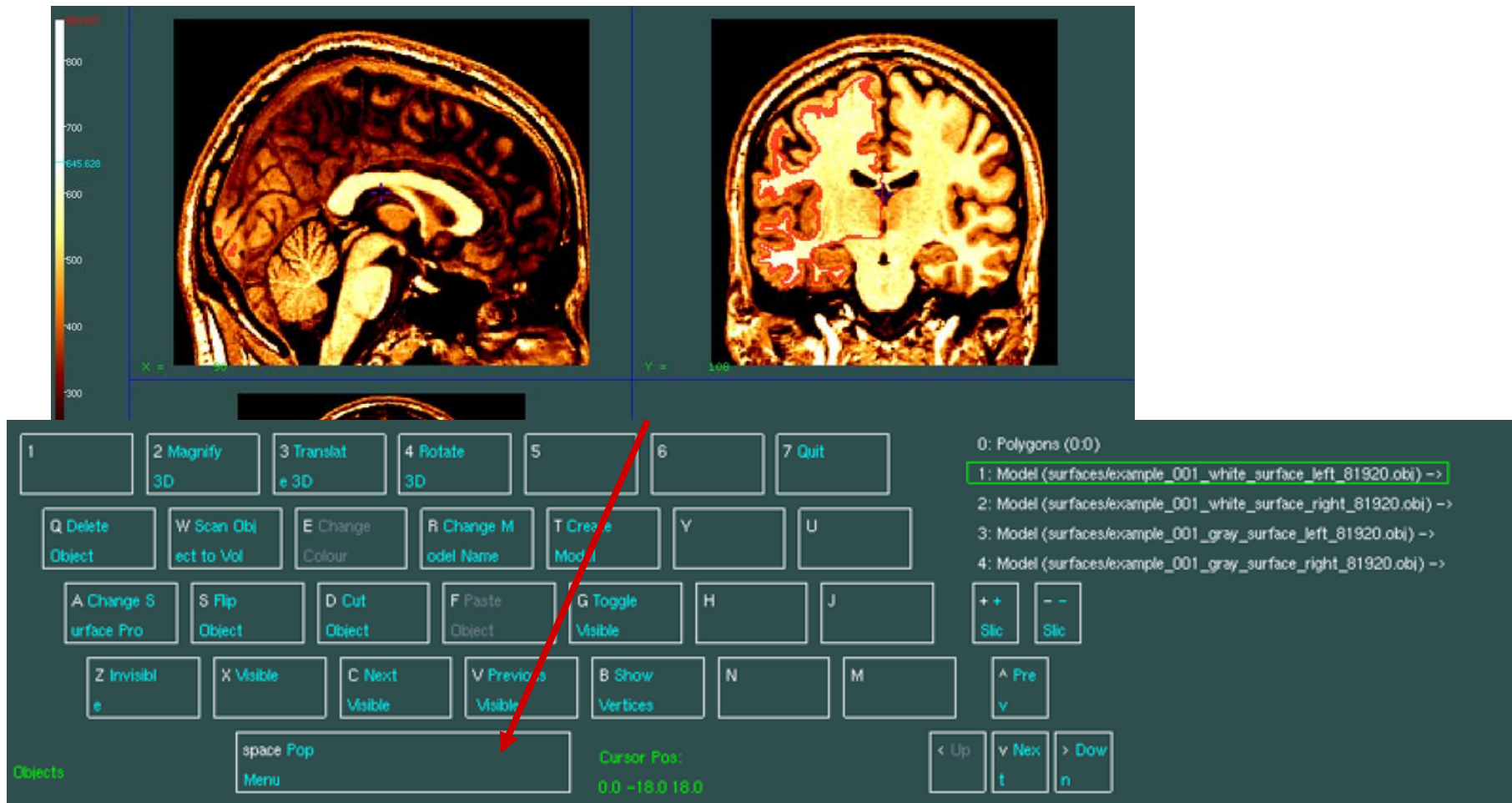
- Secondary menu appears, click "Scan Obj to Vol"



Once downloaded, use Display to view surfaces overlaid on T1's



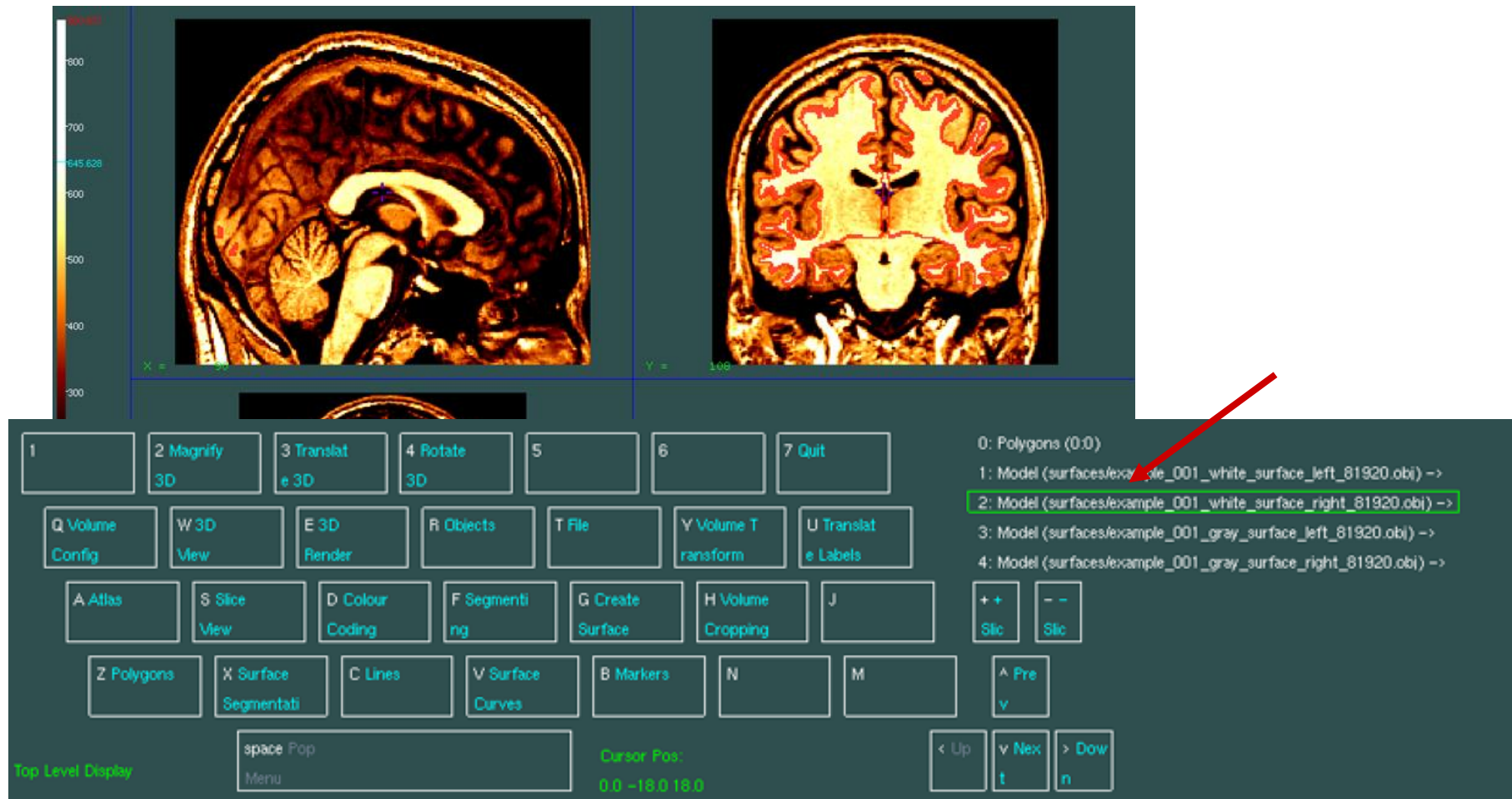
- “space / Pop Menu” to get back to main menu
- Press “Down” key and repeat for white right surf



Once downloaded, use Display to view surfaces overlaid on T1's



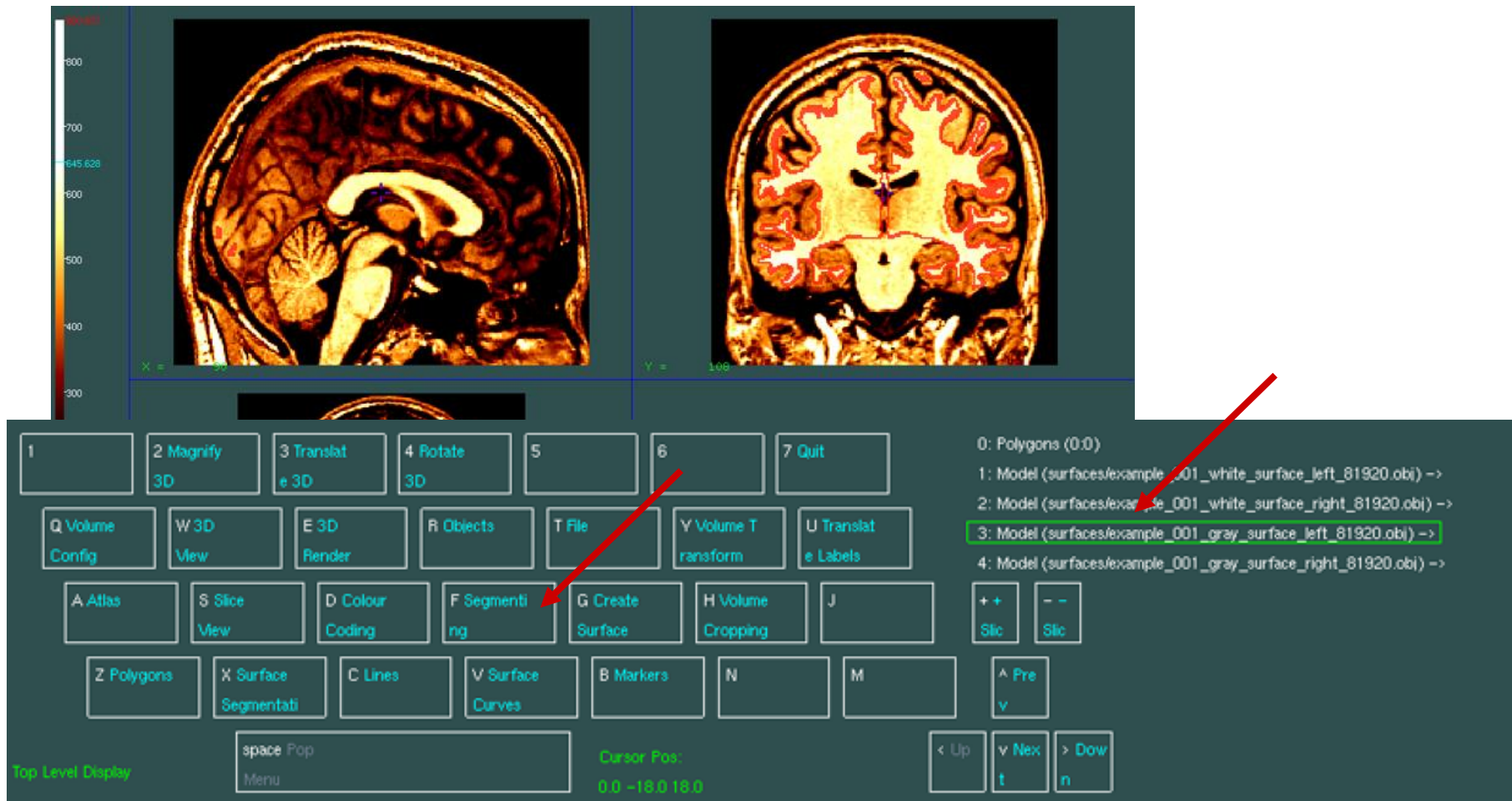
- “space / Pop Menu” to get back to main menu
- Press “Down” key and repeat for white right surf



Once downloaded, use Display to view surfaces overlaid on T1's



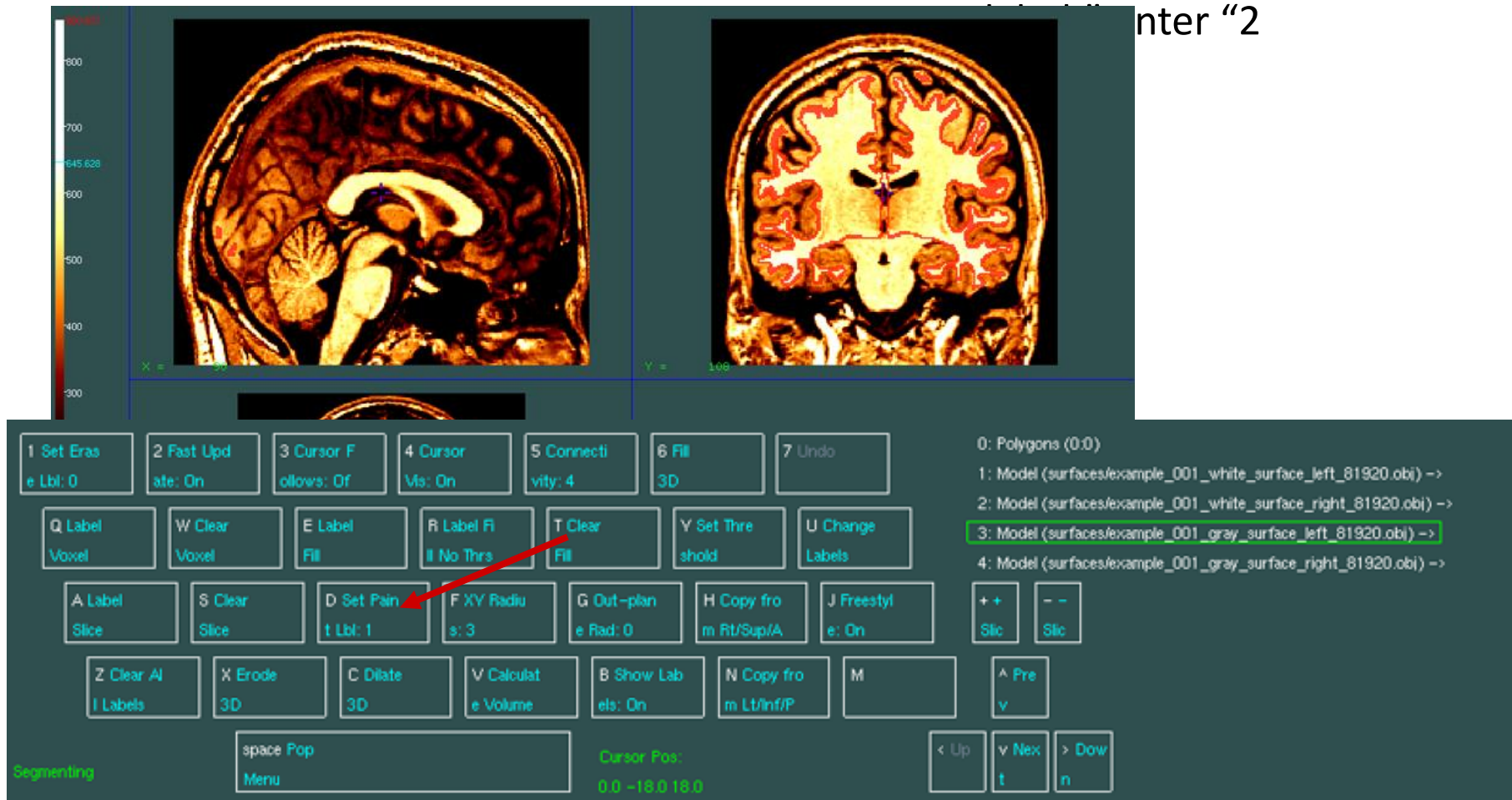
- “space / Pop Menu” to get back to main menu
- Press “Down” key to gray left surf, then click “Segmentation”



Once downloaded, use Display to view surfaces overlaid on T1's



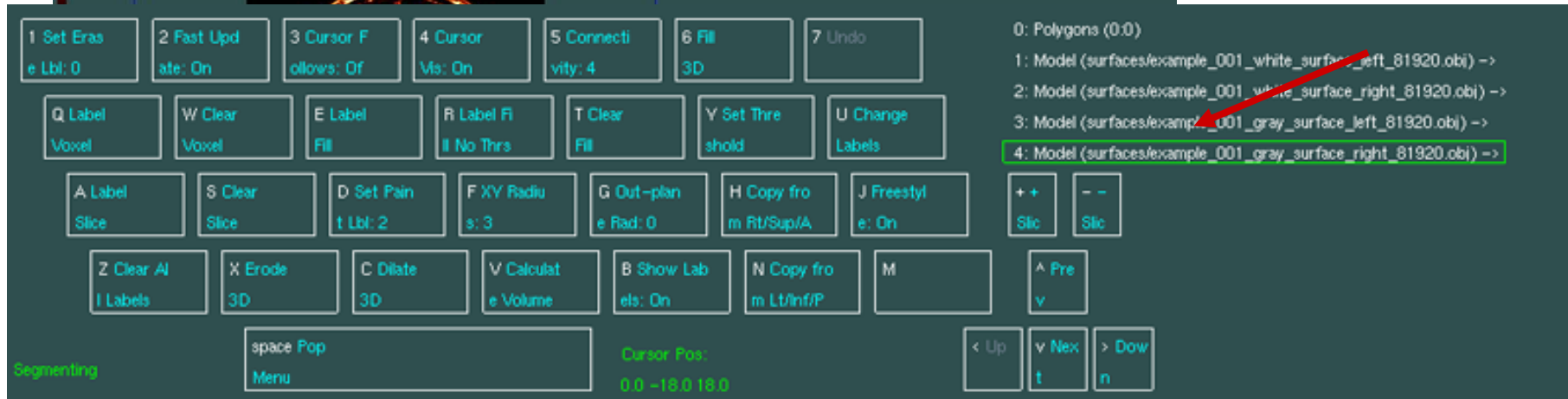
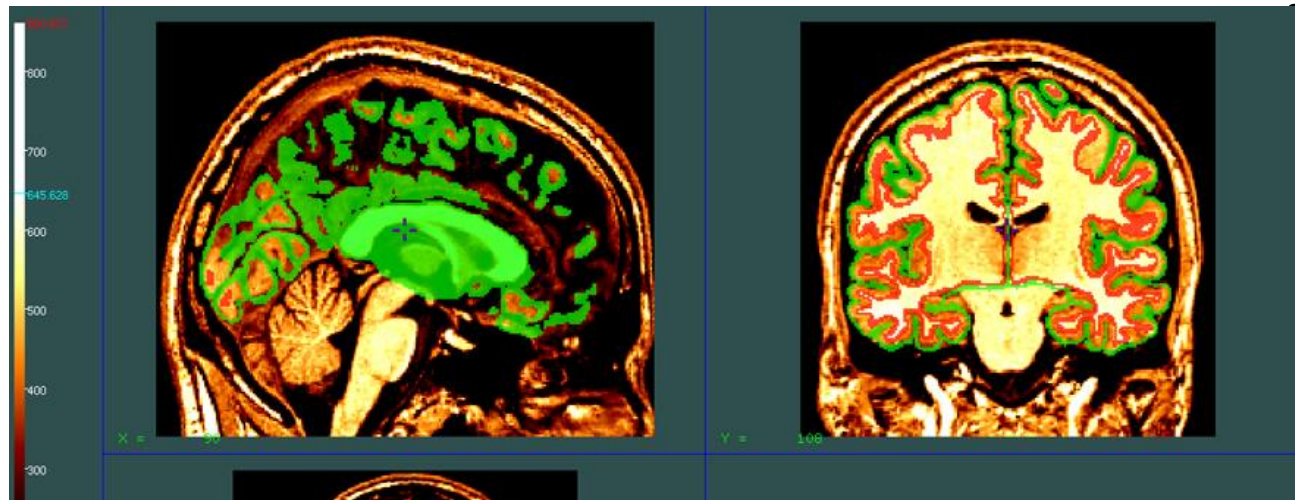
- Secondary menu appears, click “Set Paint Lbl: 1”
- Navigate back to terminal window, and where it says “Enter current paint label” enter “2”



Once downloaded, use Display to view surfaces overlaid on T1's



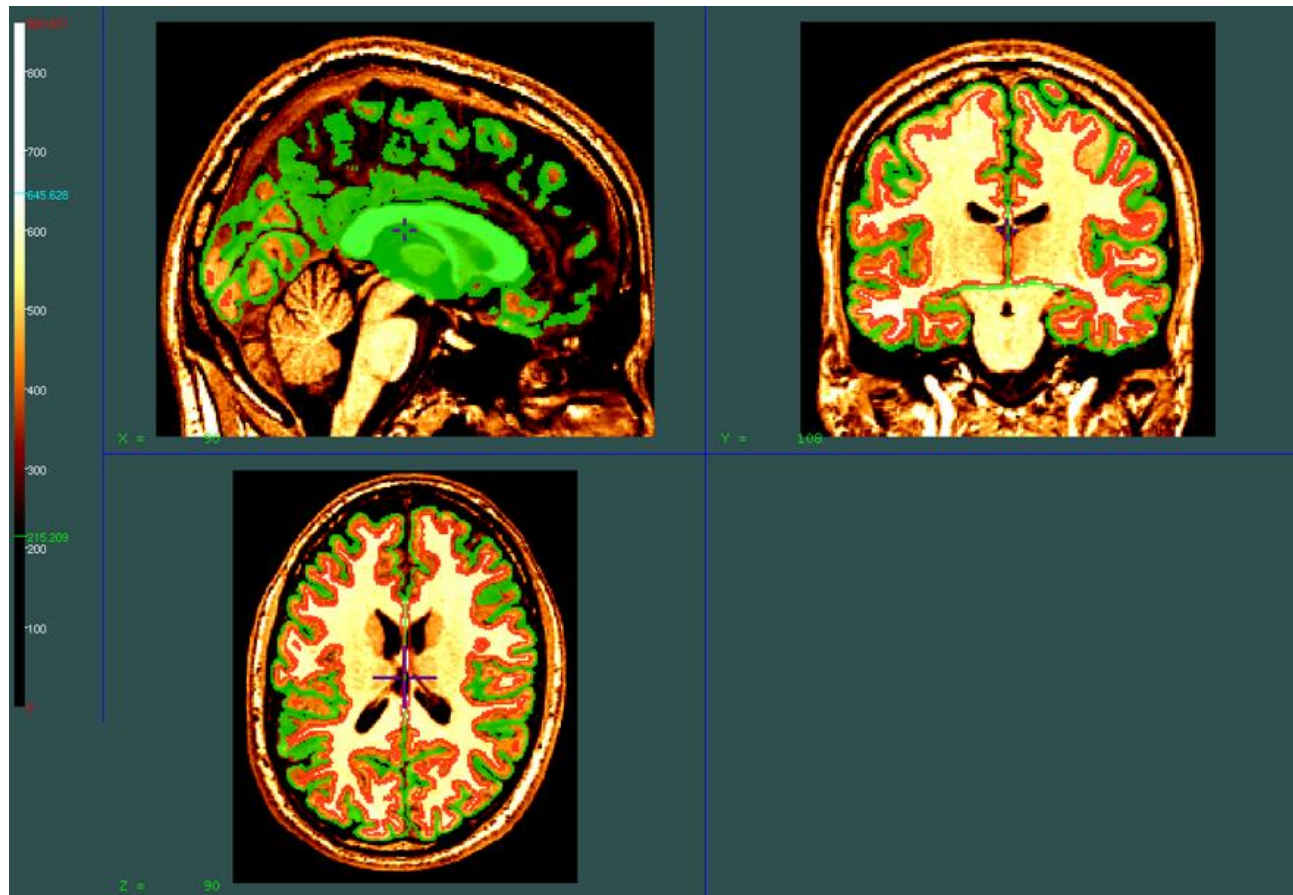
- Click “Objects,” secondary menu appears, click “Scan Obj to Vol”
- “space / Pop Menu” to get back to main menu, press “Down” arrow and



Once downloaded, use Display to view surfaces overlaid on T1's



- Now you may do further QC / inspect data for individual subjects
- Next step: group analyses / export your thickness (*.txt) files to SurfStat!



Outline



- Who is behind CIVET?
- What is CIVET?
- What's new in CIVET 2.0?
- Preparing your files for CIVET
- Running CIVET using the CBRAIN web-interface
- How do I make sense of my output? (Quality Control)
- **Important Links**

Important links:



- CBRAIN account requests: <https://cbrain.mcgill.ca/contact>
- CBRAIN login page: <https://portal.cbrain.mcgill.ca>
- CIVET documentation:

<http://www.bic.mni.mcgill.ca/ServicesSoftware/CIVET>

- Help converting your files to MINC:

<http://www.bic.mni.mcgill.ca/ServicesSoftware/ConvertingOtherFileTypesToMINC>

- SurfStat: <http://www.math.mcgill.ca/keith/surfstat/>

<http://www.bic.mni.mcgill.ca/ServicesSoftware/StatisticalAnalysesUsingSurfstatMatlab>