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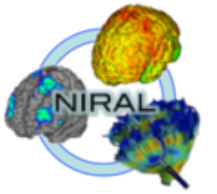

ShapePopulationViewer

User Tutorial V1.3.0

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ShapePopulationViewer

Installation

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Installation

You can either :

- Download the latest binary package on NITRC :

  https://www.nitrc.org/projects/shapepopviewer

- Download the source code on GitHub :

  https://github.com/NIRALUser/ShapePopulationViewer

  To get the source from a Linux Shell :

```
$ git clone https://github.com/NIRALUser/ShapePopulationViewer
$ git checkout v1.3.0
```

Via GitHub

If you downloaded the sources on Github, you will have to build the project using **Cmake v2.8.3** or higher.

You can then specify which kind of build you want to make using the boolean variable `ShapePopulationViewer_SUPERBUILD`.

- **Qt 4** is required *(tested with Qt4.7.4.)*
- If you don't want to use the superbuild option, you will need:

  - **VTK 5** built with QT 4 *(tested with VTK5.10.1.)*

  - **SlicerExecutionModel** built with ITK 4 *(tested with ITK4.1.)*

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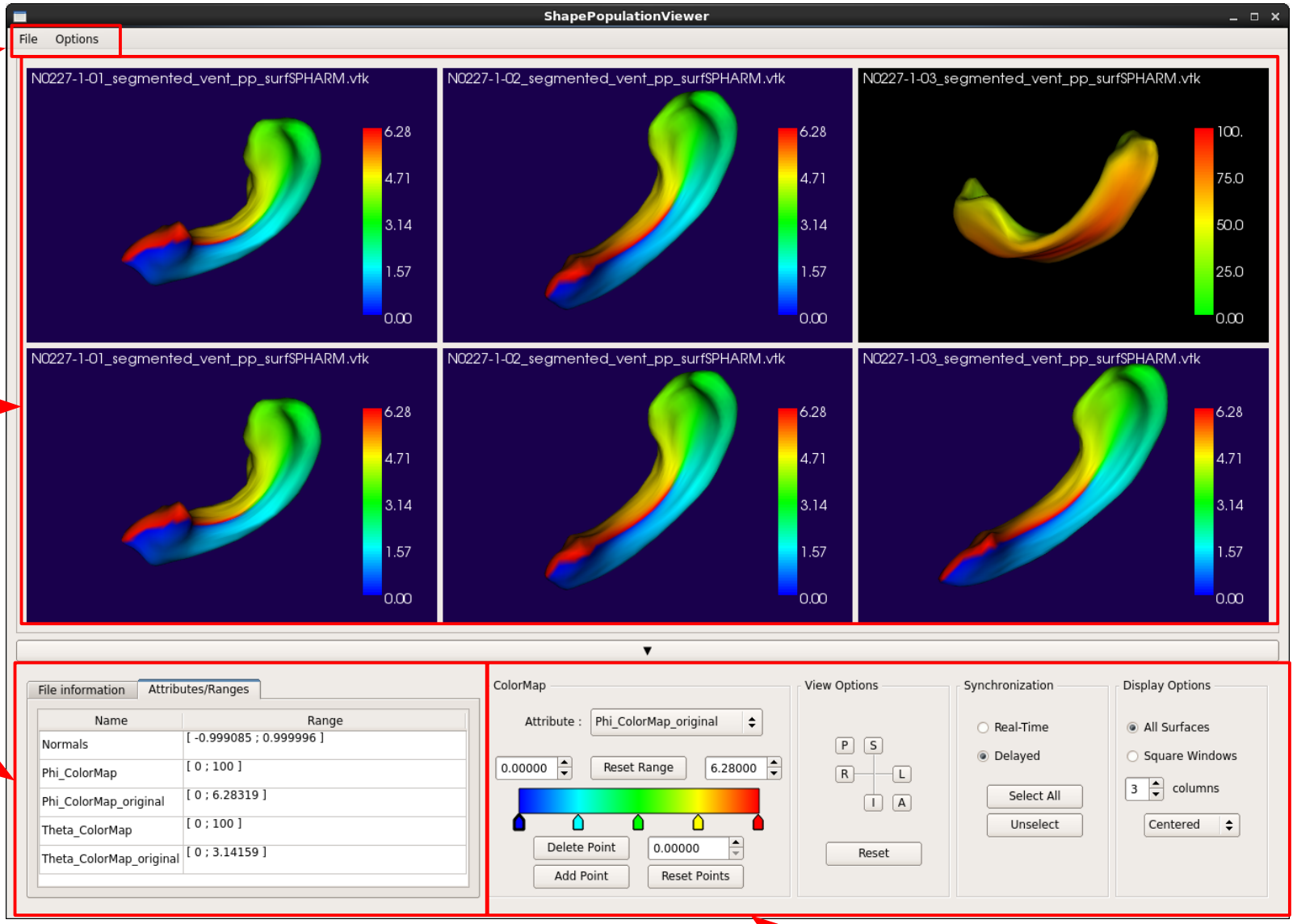
GUI : Basic Usage

GUI


Menu Bar
Display Area
Information box
Tool box
ShapePopulationViewer
File
Options
N0227-1-01_segmented_vent_pp_surfSPHARM.vtk
N0227-1-02_segmented_vent_pp_surfSPHARM.vtk
N0227-1-03_segmented_vent_pp_surfSPHARM.vtk
6.28
4.71
3.14
1.57
0.00
100.
75.0
50.0
25.0
File information
Attributes/Ranges
Name
Range
Normals
[-0.999085 ; 0.999996]
Phi_ColorMap
[0 ; 100]
Phi_ColorMap_original
[0 ; 6.28319]
Theta_ColorMap
[0 ; 100]
Theta_ColorMap_original
[0 ; 3.14159]
ColorMap
Attribute :
Phi_ColorMap_original
0.00000
Reset Range
6.28000
Delete Point
0.00000
Add Point
Reset Points
View Options
P
S
R
L
I
A
Reset
Synchronization
Real-Time
Delayed
Select All
Unselect
Display Options
All Surfaces
Square Windows
3
columns
Centered

Loading mesh(es)

There are multiple ways to load surfaces using the *File* menu:

- Loading vtk file(s) with “Open Files”

  > select the files you want to load

- Loading an entire directory with “Open Directory”

  > all the vtk files in the selected directory will be loaded

- Loading files from a Comma Separated Value file with “Load CSV”

  > your file will be open in a spreadsheet to allow you to select the files you want to load

Add and delete meshes

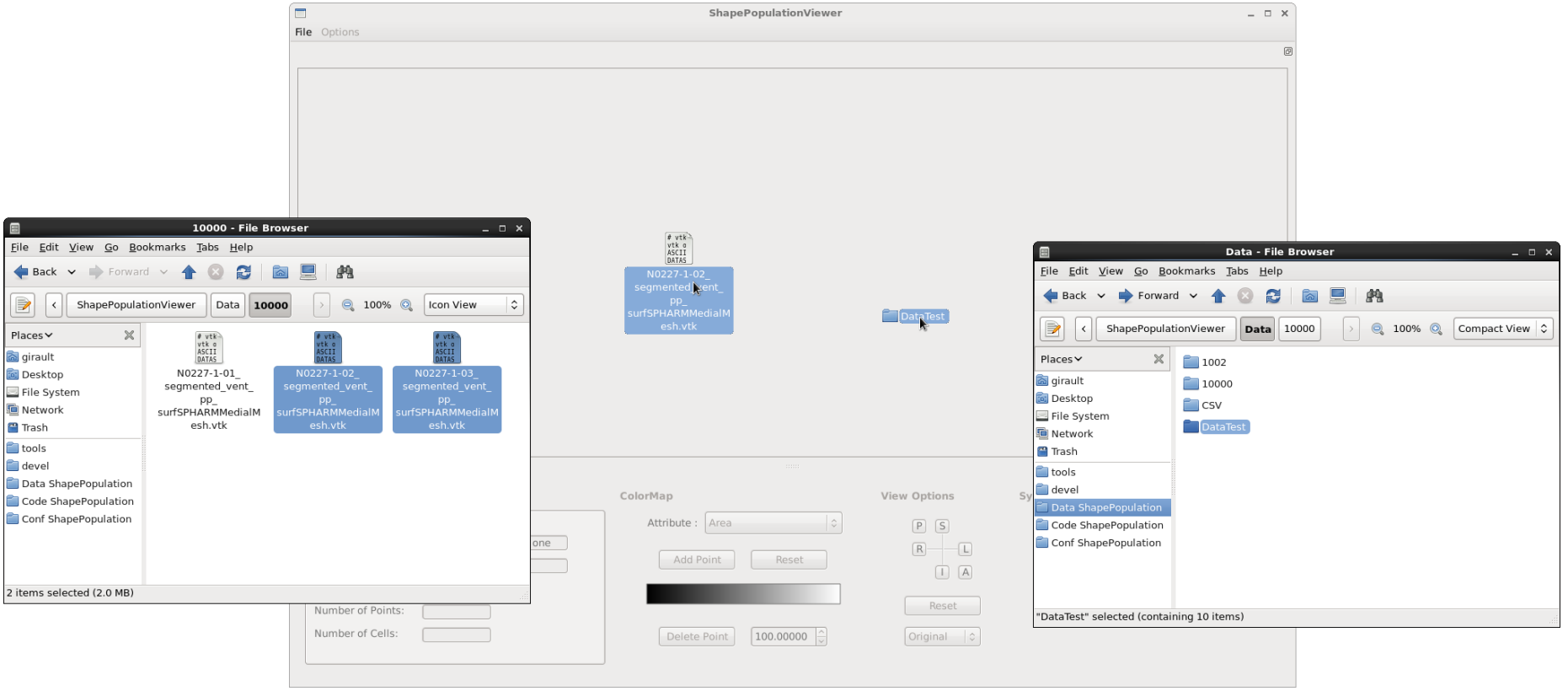
ADDING

Once meshes are displayed in the Display Area, “Open” become “Add” : loading new files will add the meshes to the current display window.

DELETING

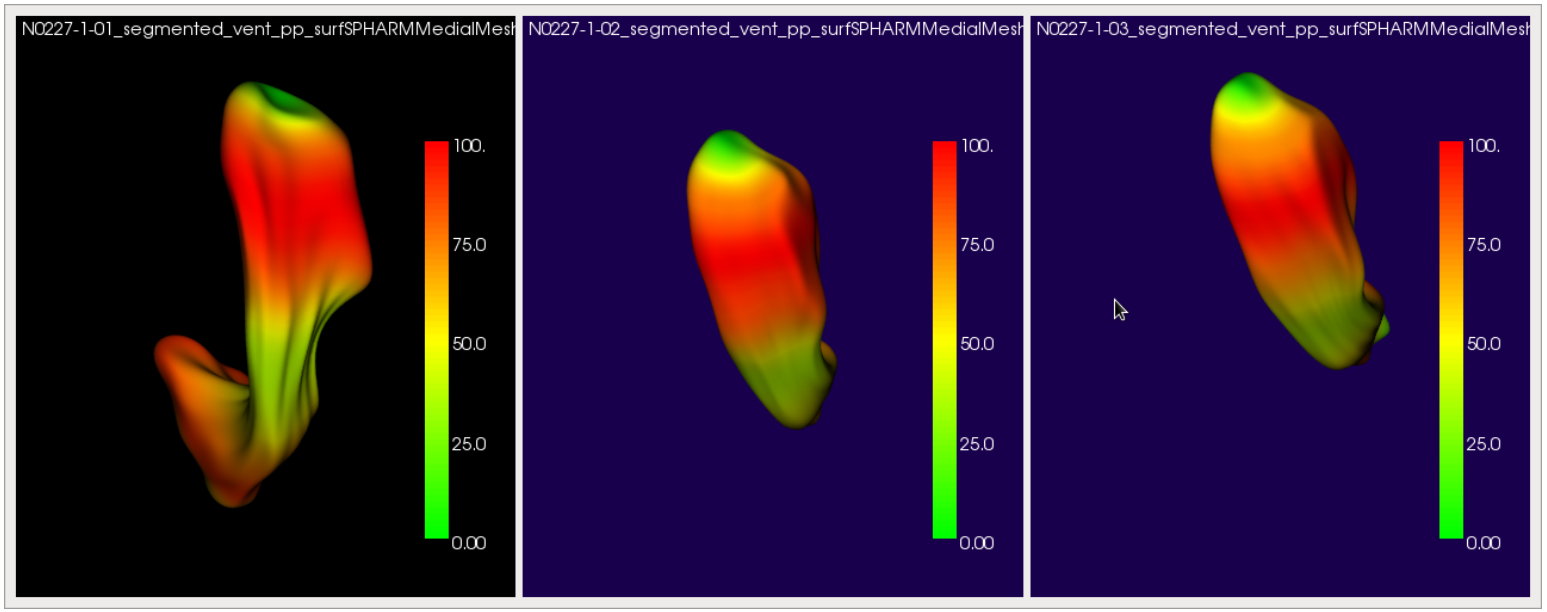
You can delete the selected items or all the items using the options in the *File* menu : “Delete Selection” and “Delete All”.

Drag & Drop meshes



You can also load/add files (vtk files, directories or CSV files) by dropping them over the Display Area.

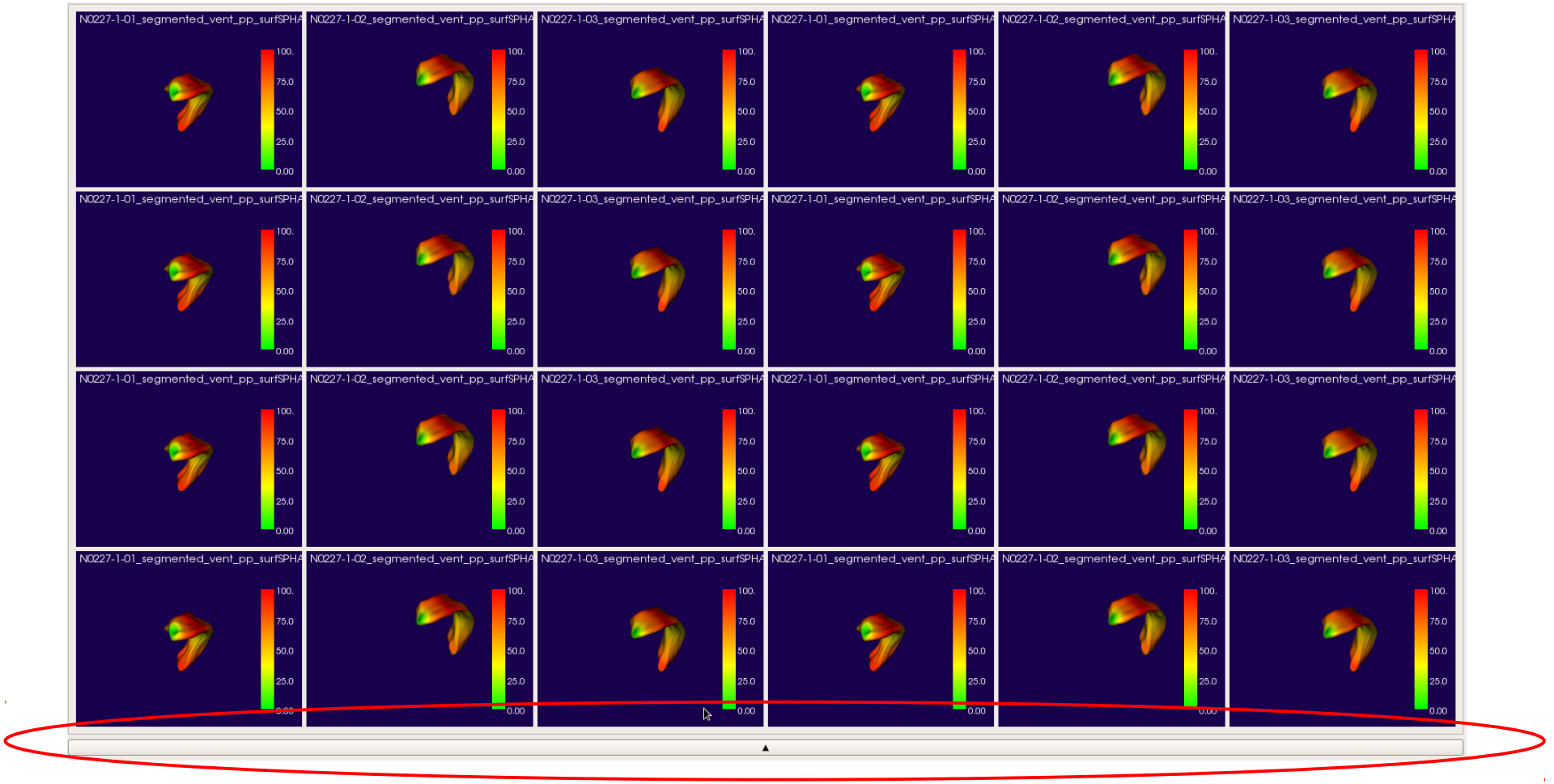
Interacting with surfaces



In the Display Area, you can interact with multiple surfaces at the same time by selecting their respective windows and then interacting (click & drag, roll...) with only one of them :

- **CTRL + Left Mouse** : Select or Unselect the window on which you clicked
- **CTRL + A** : Select All
- **ESC** : Unselect All

Interacting with surfaces



You can also **only display the meshes in full screen** using the button between the Display Area and the tools below.

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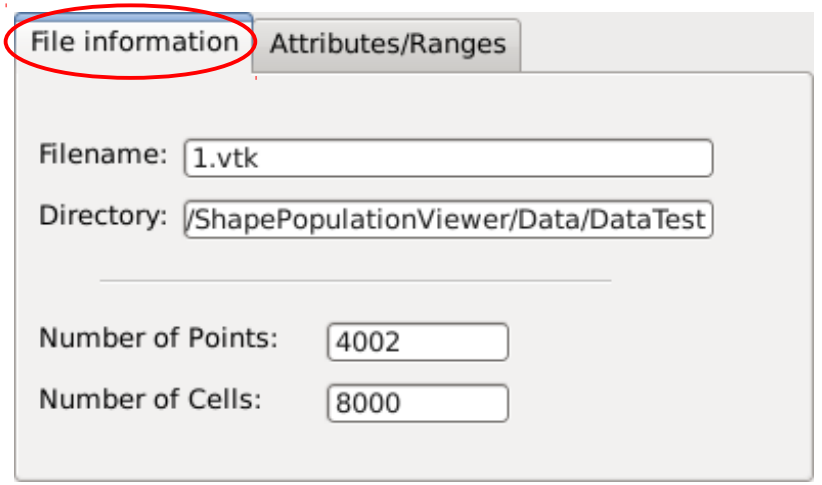
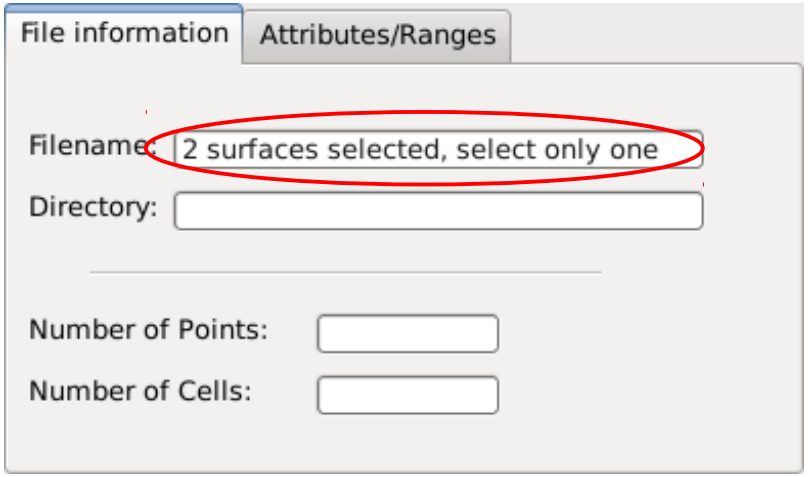
GUI : Information Box

File Information

The first tab of the Information Box displays information about the file such as its **name and directory**, but also information about the loaded surface : **number of points and cells.**



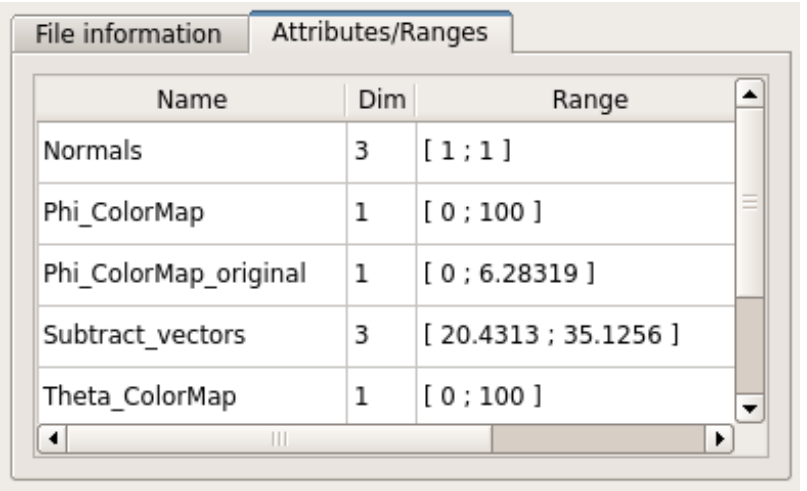
If you select more than one surface at a time, you will not be able to get any information about them. You will have to select only one mesh to get its information.



Attributes/Ranges

The second tab of the Information Box displays the **attributes names, dimension and ranges** *(magnitude if the Attribute is a vector field)*

- If different surfaces are loaded, **only the common attributes will be displayed.**
- When you select multiple meshes, the ranges displayed will be computed between the **minimum and the maximum among all the selected surfaces**



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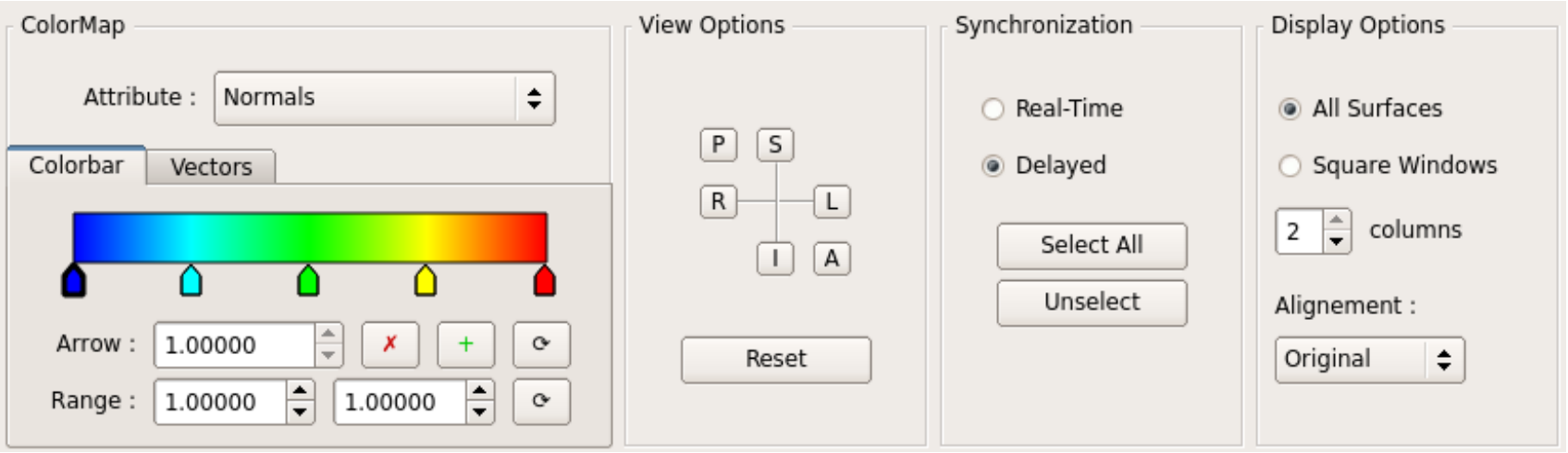
GUI : Tool Box

Tool Box



- **Colormap** : Modify the attribute displayed on the meshes
  - Colorbar : customize gradient colors and range displayed on the meshes
  - Vectors : options for vector visualization
- **View Options** : Basic interactions with the camera
- **Synchronization** : Customize your interaction with the surfaces
- **Display Options** : Customize how surfaces are displayed/positioned

Colormap and Attribute

A colormap is relative to an attribute,

not to a mesh.

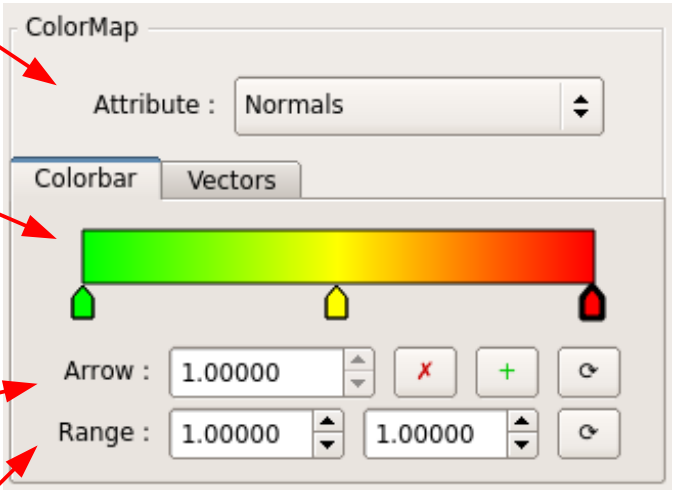
If you select multiple meshes, the display properties

of the first selected mesh will be used for all the other selected meshes

(camera position, displayed attribute, colormap)

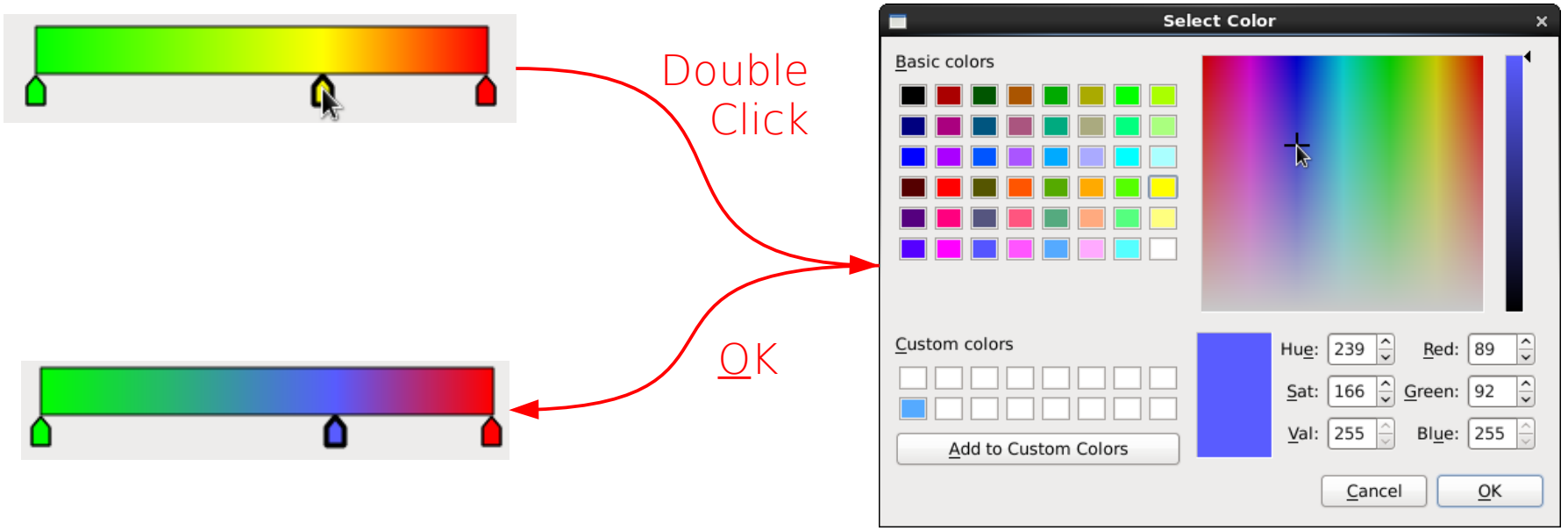
Colorbar (1/2)

- **Attribute ComboBox :** you can define which pointdata values you want to display : scalar or vector fields.
- **ColorBar :** displays the gradient computed between the chosen range. Grab and move an arrow to modify its scalar value associated, double-click to modify its color.
- **Arrow options :** delete the selected arrow or modify its position using the comboBox. Add new points or reset them.
- **Range values :** range to display the colormap between, or reset to the common ranges of the meshes.



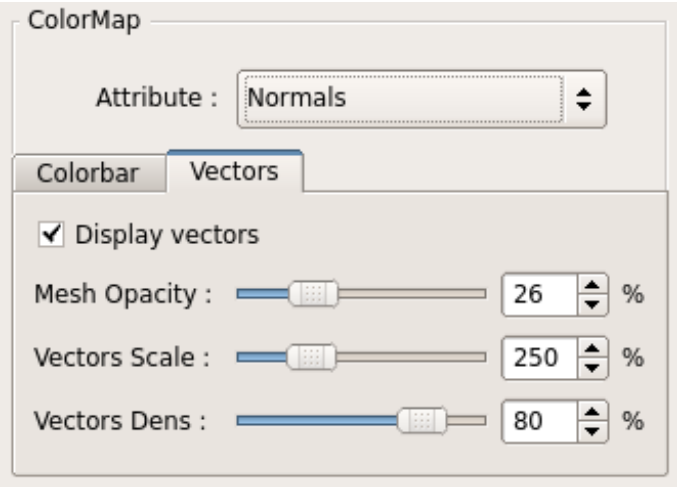
Colorbar (2/2)

- To modify a **color** associated with an arrow, simply **double-click** on it.
- A **colorPicker** window will appear, allowing you to select the desired color.

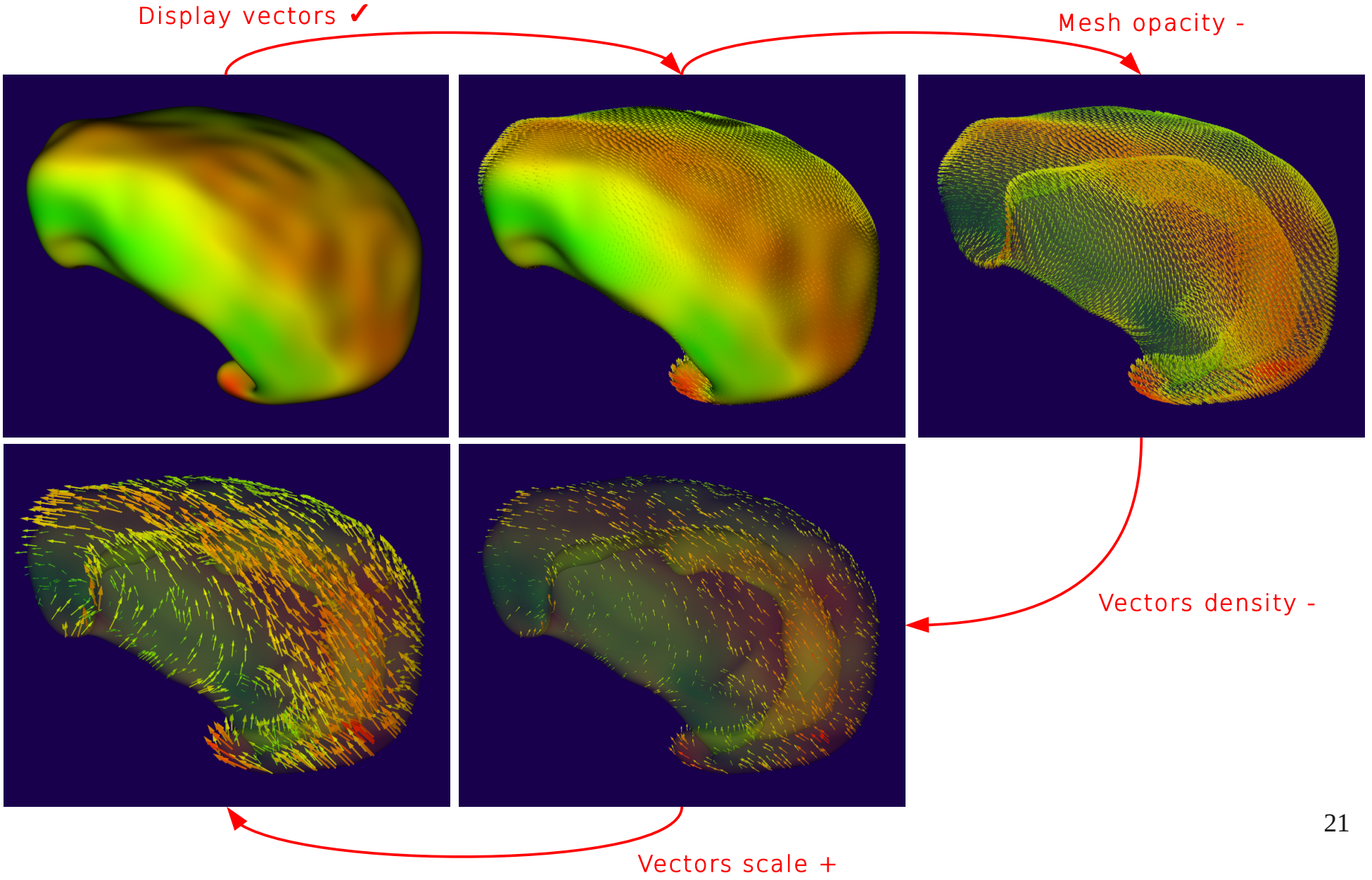


Vectors (1/2)

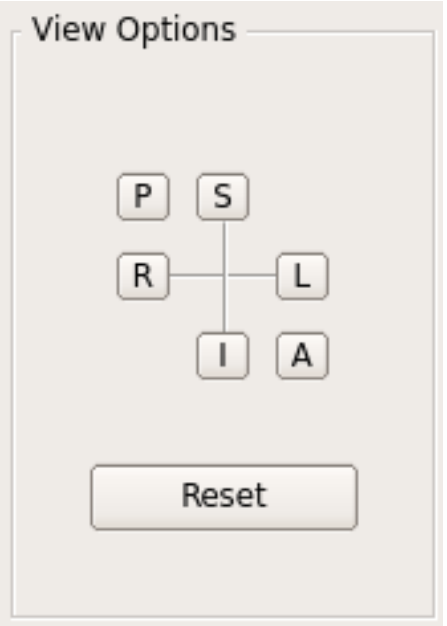
- **Attribute ComboBox :** The Vector tab is enabled if the attribute is a vector field.
- **Display vectors** : hide or show vector glyphs on the surfaces.
- **Mesh Opacity** : modifies the mesh opacity, to emphasize the vector glyphs.
- **Vectors Scale** : modifies the glyphs size.
- **Vectors Density** : masks some points to display less glyphs.



Vectors (2/2)

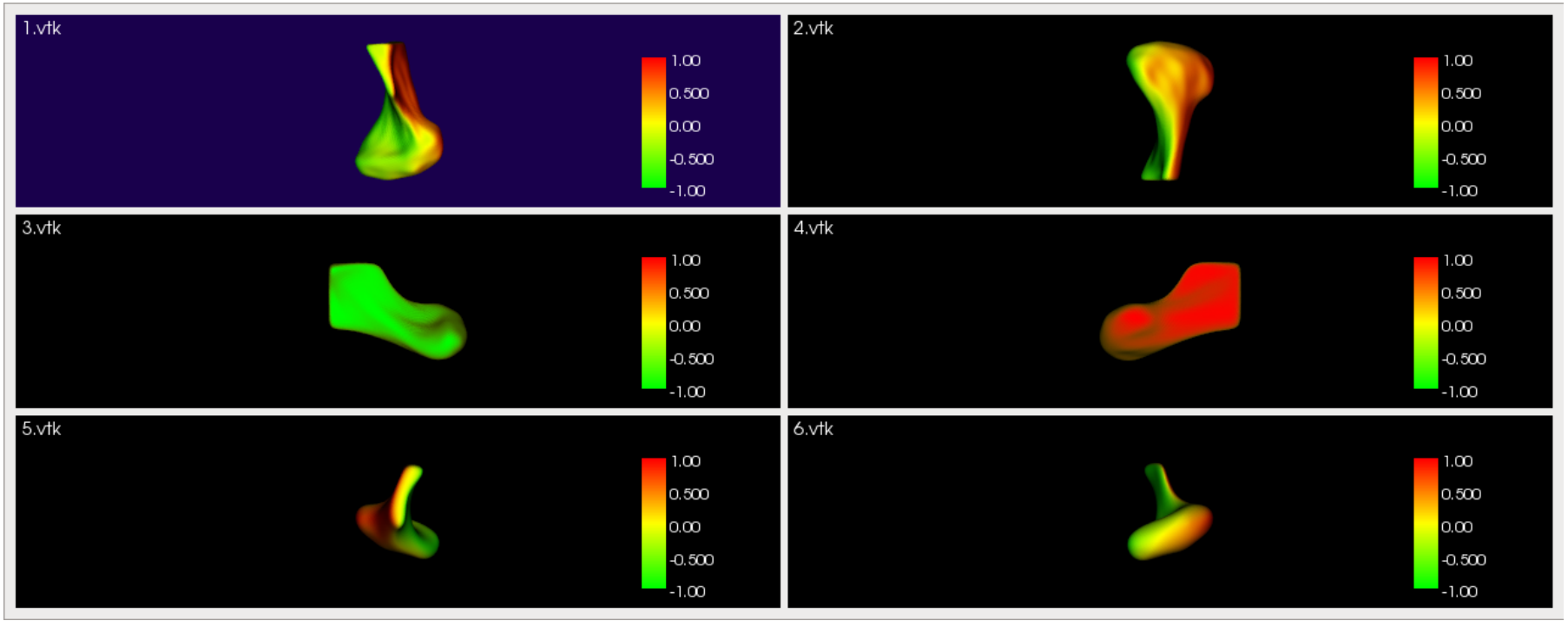

Display vectors ✓
Mesh opacity -
Vectors density -
Vectors scale +

View Options (1/3)



- **Axis Buttons :** these 6 buttons allow the user to position the camera along the respective axis
- **Reset** : reset the focal point position and distance to the camera

View Options (2/3)



Axis buttons : Example of the 6 camera positions *:*

Superior	Inferior
Sagittal Right	Sagittal Left
Posterior	Anterior

View Options (3/3)

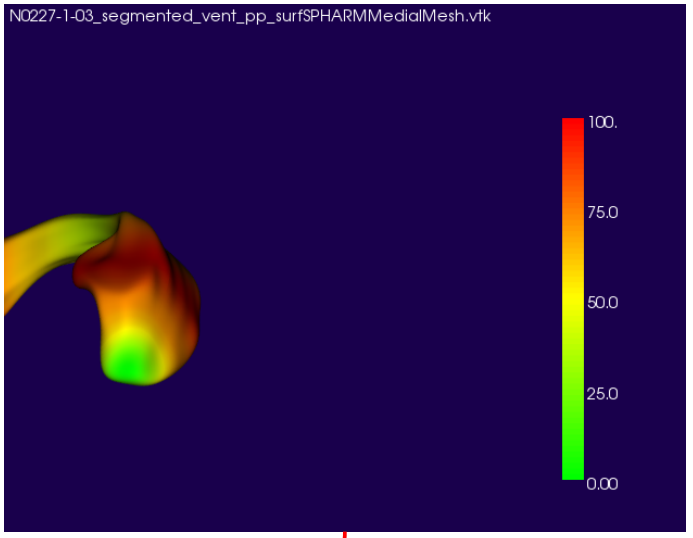
Reset Button :

Reset the focal point position (1)

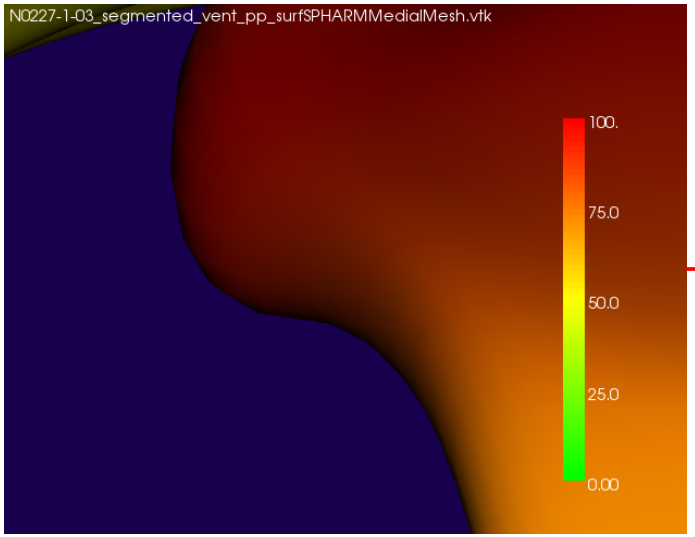
> modified by pressing the middle mouse button & dragging

Reset the camera distance (2)

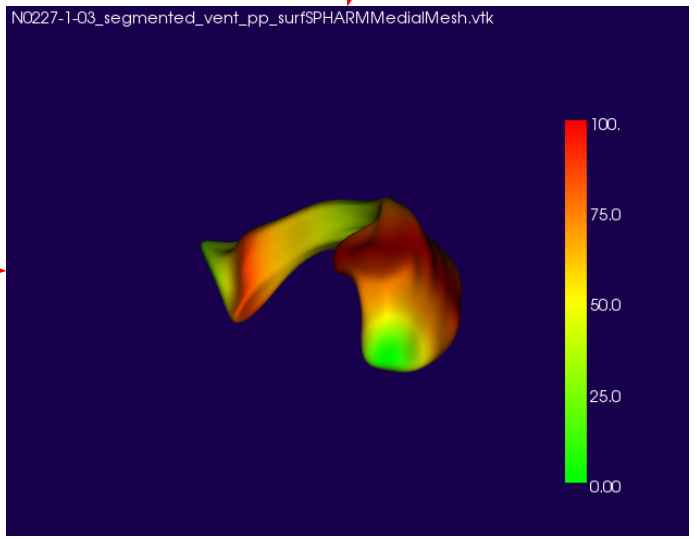
> modified by rolling the middle mouse button



(1)



(2)



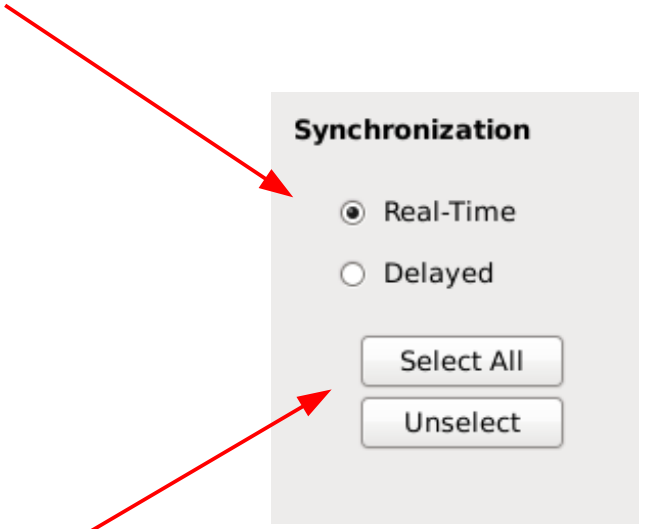
Synchronization

- **Real-Time/Delayed :**

  - *Real-Time :* all the selected meshes are **rendered at the same time** as the one being interacted with.

  - *Delayed :* all the selected meshes are **rendered once the interaction with one of them is finished**.

  This option is useful when processing a large number of meshes/points.



- **Select All** : select all the meshes (Ctrl+A)
- **Unselect** : unselect all the meshes (ESC)

Display Options (1/2)

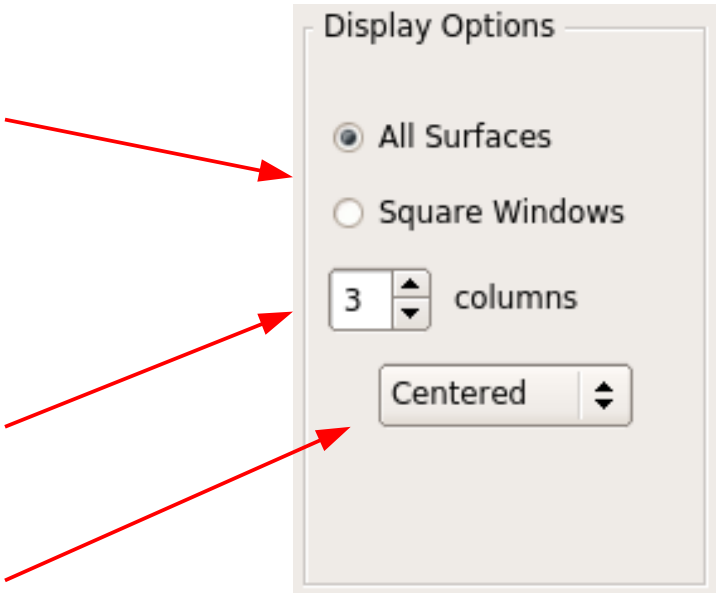
- **All Surfaces / Square Windows :**

  - *All Surfaces :* all the meshes will be displayed to **fit in the display Area,** modifying their render-window size.

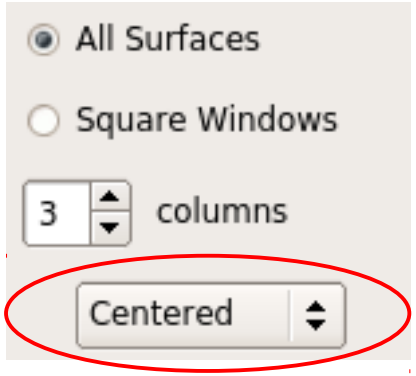
  - *Square Windows :* the meshes render-windows will be square. You will be able to scroll in the Display Area to visualize all the meshes.

- **Columns** : Organizes the windows in the indicated number of columns.

- **Original/Centered ComboBox** : define the position of the surfaces



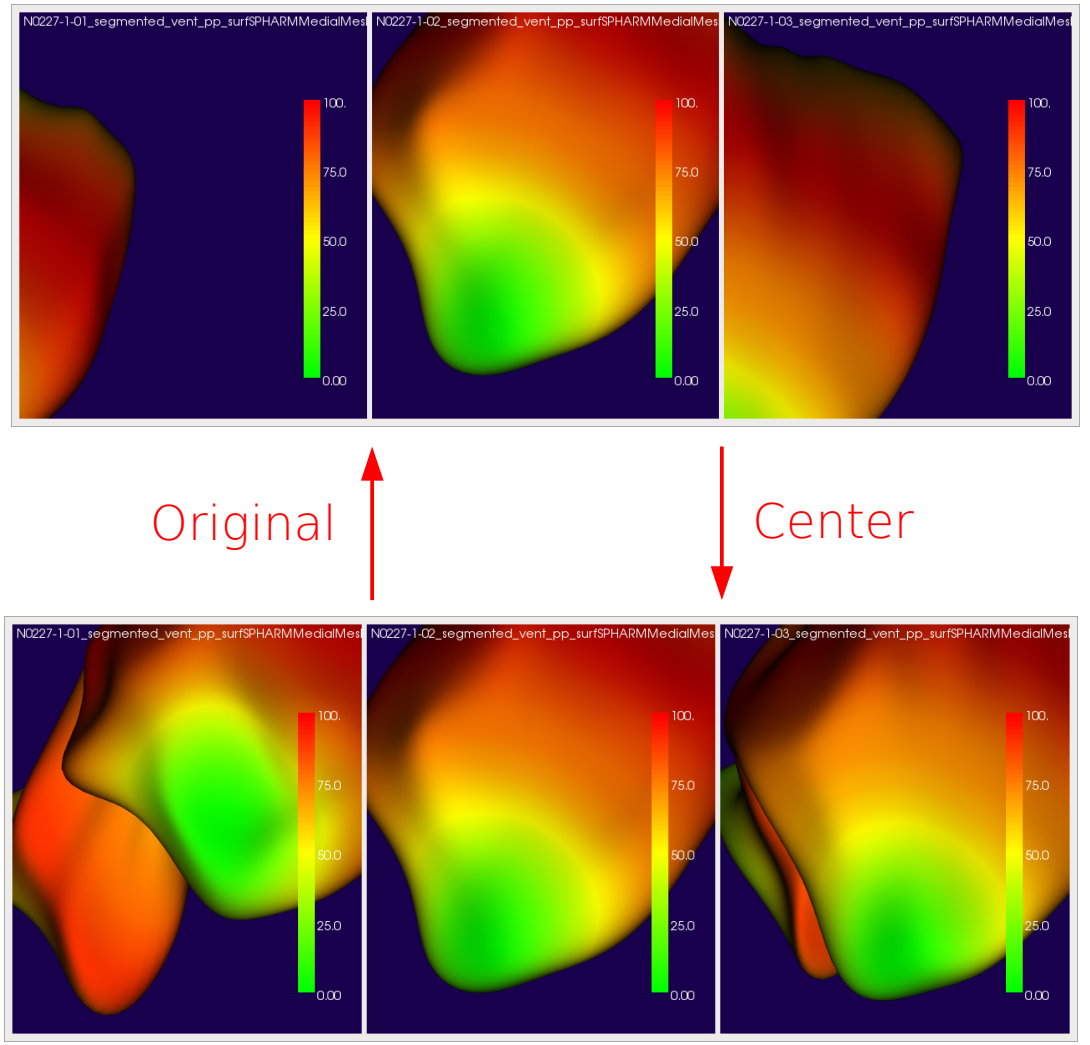
Display Options (2/2)



Original/Centered ComboBox :

By default, surfaces are displayed with the position values associated to every vertex stored in the vtk file : they are not aligned.

When a mesh is “**centered**”, using this tool, **its center of gravity is translated to the origin**, allowing the user to properly visualize and compare different surfaces.



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GUI : Advanced Options

Option Menu

The menu bar contains an “Option” Menu which includes three sub-options :

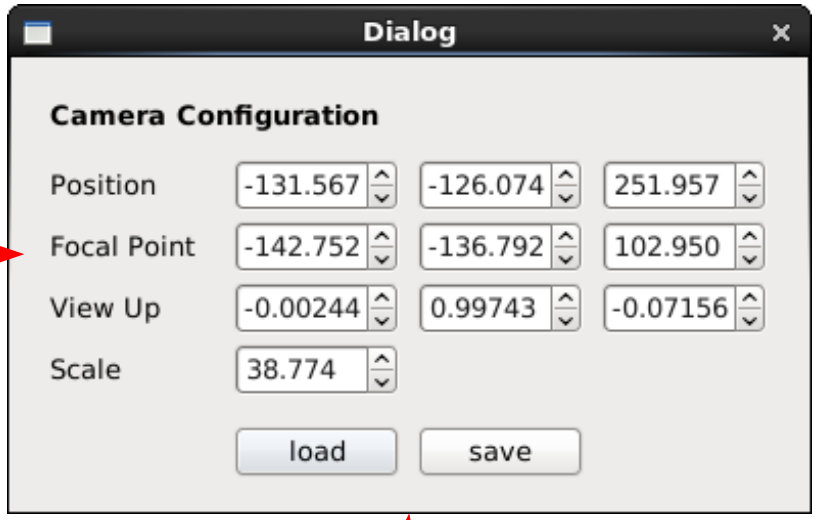
- **Camera configuration** : modify the camera configuration values, load and save them into a .pvcc file.
- **Load & Save Colorbar** : load & save the arrows colors and positions into a .spvcm file.
- **Window colors** : customize the background and text colors used in the render windows.

Camera Configuration

The camera Configuration tab launches a dialog window to configure your camera.

You can :

- **directly modify** the Position, Focal Point, View Up vectors and the Scale scalar of the camera.
- **Load or Save** a .pvcc file (ParaView camera configuration)



Be careful about your mesh position : Centered or Original.

This will influence the camera configuration values.

Load & Save Colorbars

```
<?xml version="1.0" encoding="UTF-8"?>
<SPVColorMap description="ShapePopulationViewer ColorMap" version="1.0">
    <colormap name="reset" points="3">
        <colorpoint index="0">
            <position>0</position>
            <R>0</R>
            <G>1</G>
            <B>0</B>
        </colorpoint>
        <colorpoint index="1">
            <position>0.5</position>
            <R>1</R>
            <G>1</G>
            <B>0</B>
        </colorpoint>
        <colorpoint index="2">
            <position>1</position>
            <R>1</R>
            <G>0</G>
            <B>0</B>
        </colorpoint>
    </colormap>
</SPVColorMap>
```

You can save and load colorpoints to use custom colorbars quickly.

The file format spvcm stands for “ShapePopulationViewer ColorMap”.

It is a very basic xml file which stores the points, their relative position between 0 and 1, and their color components, RGB, between 0 and 1.

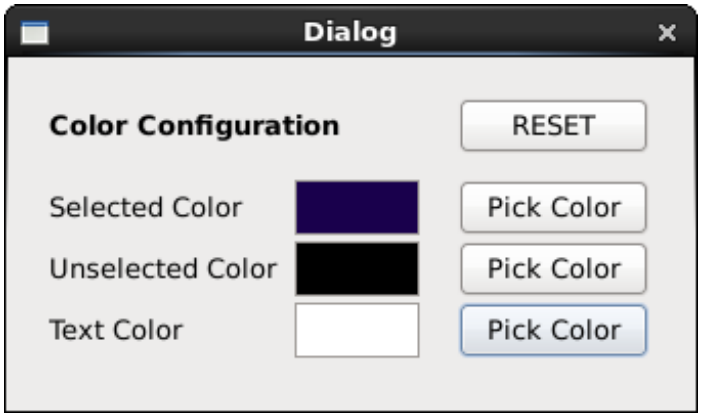
Drag & Drop

Drag & Drop also works with the camera and colormap configurations files.

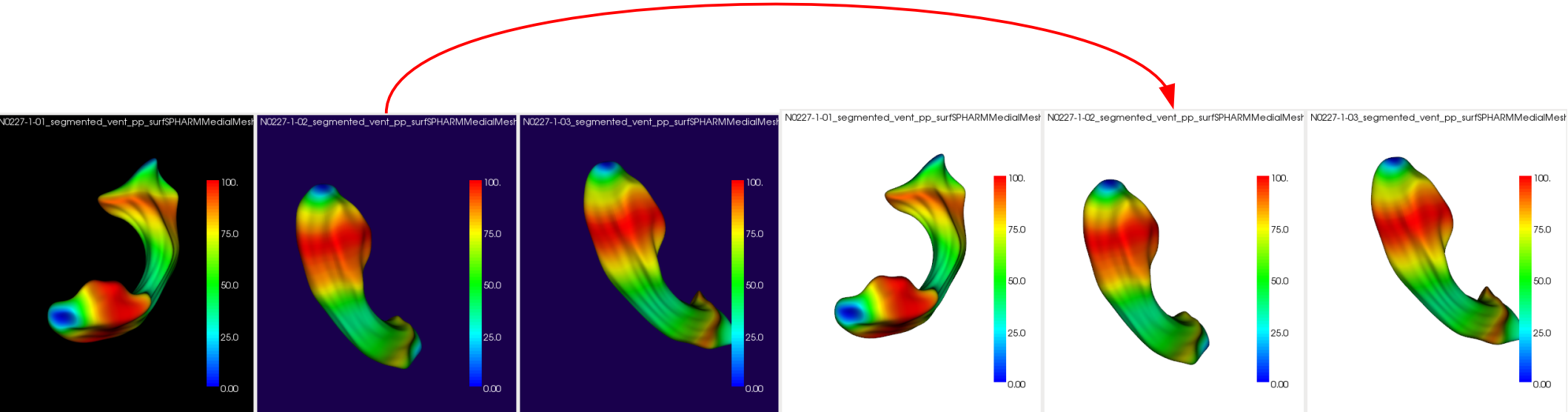
You can drop .pvcc files and .spvcm files in the MainWindow to load the camera configurations and the colorpoints easily.

Window Colors

The Window colors tab launches a dialog window to customize the **background and text colors**.



It is useful for example if you want to display white backgrounds, to present results in a publication :



ShapePopulationViewer

Command Line Interface

Command Line Interface

ShapePopulationViewer can be launched from the command line to directly load **vtk files/directory**, and **configuration files** (colormap and/or camera).

You can visualize all the options by running :

```
$ ./ShapePopulationViewer --help
```

Command Line Interface

`-v <std::vector<std::string>>,  --vtkfiles <std::vector<std::string>>`

.vtk Input files (accepted multiple times)

`-d <std::string>,  --directory <std::string>`

Input directory

`--csv <std::string>`

.csv Input file

`-c <std::string>,  --camera <std::string>`

.pvcc Camera Configuration File

`-g <std::string>,  --gradient <std::string>`

.spvcm Colormap Configuration File

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ShapePopulationViewer

Help & Contact

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Help

Wiki

www.nitrc.org/plugins/mwiki/index.php/shapepopviewer:MainPage

Forums

www.nitrc.org/forum/?group_id=759

Bug & Features Tracker

www.nitrc.org/tracker/?group_id=759

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Contact

For additional remarks or questions, please email :

girault@mail.unc.edu