

MRS4Brain Toolbox – Registration guide

The *MRS4Brain Toolbox* utilizes an additional software, *ANTs*, for registration and segmentation purposes. *ANTs* is designed for the UNIX environment. To facilitate this on non-UNIX systems, we employ another tool called *Docker Desktop*, enabling the containerization of Linux-built software.

Links: [ANTs GitHub](#) and [Docker Desktop website](#)

MacOS Monterey and later

First time:

1. Download and install docker desktop from [Docker desktop download](#)
 2. Start docker desktop, do not need to create an account
 3. Run in Terminal: `docker pull antsx/ants:latest`
 4. Check that the image is successfully installed on docker by running in Terminal: `docker run --rm antsx/ants /opt/ants/bin/antsRegistration`
- If this return something as in Figure 1, *ANTs* has been successfully installed on your computer using docker desktop.

Other times:

Just launch docker desktop when you need to use the MRSI segmentation tool, everything should be done automatically.

Windows 10 and later

First time:

1. Run in Windows Powershell: `wsl --update` (if wsl is not installed, please run `wsl --install`, you will then need to restart your computer)
 2. Download and install docker desktop from [Docker desktop download](#)
 3. Start docker desktop, do not need to create an account
 4. Run in Windows Powershell: `docker pull antsx/ants:latest`
 5. Check that the image is successfully installed on docker by running in Windows Powershell: `docker run --rm antsx/ants /opt/ants/bin/antsRegistration`
- If this return something as in Figure 2, *ANTs* has been successfully installed on your computer using docker desktop.

Other times:

Just launch docker desktop when you need to use the MRSI segmentation tool, everything should be done automatically.

```

(not spacing).

-c, --convergence MxNxO
    [MxNxO,<convergenceThreshold=1e-6>,<convergenceWindowSize=10>]
    Convergence is determined from the number of iterations per level and is
    determined by fitting a line to the normalized energy profile of the last N
    iterations (where N is specified by the window size) and determining the slope
    which is then compared with the convergence threshold.

-s, --smoothing-sigmas MxNxO...
    Specify the sigma of gaussian smoothing at each level. Units are given in terms
    of voxels ('vox') or physical spacing ('mm'). Example usage is '4x2x1mm' and
    '4x2x1vox' where no units implies voxel spacing.

-f, --shrink-factors MxNxO...
    Specify the shrink factor for the virtual domain (typically the fixed image) at
    each level.

-u, --use-histogram-matching
    Histogram match the images before registration.

-w, --winsorize-image-intensities [lowerQuantile,upperQuantile]
    Winsorize data based on specified quantiles.

-x, --masks [fixedImageMask,movingImageMask]
    Image masks to limit voxels considered by the metric. Two options are allowed
    for mask specification: 1) Either the user specifies a single mask to be used
    for all stages or 2) the user specifies a mask for each stage. With the latter
    one can select to which stages masks are applied by supplying valid file names.
    If the file does not exist, a mask will not be used for that stage. Note that we
    handle the fixed and moving masks separately to enforce this constraint.

--float
    Use 'float' instead of 'double' for computations.

--mnc
    Use MINC file formats for transformations.
    <VALUES>: 0

--random-seed seedValue
    Use a fixed seed for random number generation. By default, the system clock is
    used to initialize the seeding. The fixed seed can be any nonzero int value.

-v, --verbose (0)/1
    Verbose output.

-h
    Print the help menu (short version).

--help
    Print the help menu. Will also print values used on the current command line
    call.

(base) ➤ -

```

Figure 1: ANTs successfully installed on docker desktop and ready to be used by the toolbox with MacOS.

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Sélection Windows PowerShell

-c, --convergence MxNxO
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    Verbose output.

-h
    Print the help menu (short version).

--help
    Print the help menu. Will also print values used on the current command line

```

Figure 2: ANTs successfully installed on docker desktop and ready to be used by the toolbox with Windows OS.