Using an Initial Model

> ⓘ **Location of Initial Models at MICe**
>
> We currently have a number of initial models at MICe that are setup for use with Pydpiper.
>
> They can be found in:
>
> /hpf/largeprojects/MICe/tools/initial-models/
>
> Some common initial models are:
>
> 40um:
>
> /hpf/largeprojects/MICe/tools/initial-models/Pydpiper-40-micron-basket-dec-2014
>
> 56um:
>
> /hpf/largeprojects/MICe/tools/initial-models/Pydpiper-56-micron-basket-may-2014
>
> MEMRI 90um:
>
> /hpf/largeprojects/MICe/tools/initial-models/Pydpiper-MEMRI-90micron-saddle-july-2015
>
> The proper command line options for each are:
>
> (40 microns) --init-model=/hpf/largeprojects/MICe/tools/initial-models/Pydpiper-40-micron-basket-dec-2014/basket_mouse_brain_40micron.mnc
>
> (56 microns) --init-model=/hpf/largeprojects/MICe/tools/initial-models/Pydpiper-56-micron-basket-may-2014/basket_mouse_brain.mnc
>
> (90 microns) --init-model=/hpf/largeprojects/MICe/tools/initial-models/Pydpiper-MEMRI-90micron-saddle-july-2015/p65_MEMRI_mouse_brain.
> mnc

Using a Initial Model

For the first part of the registration process, a registration target is required. One may be provided in the form of an initial model, or the code can "bootstrap" (use one of the input images as a target).

Options

Two options are available when specifying an initial model:

1. An image in "standard" registration space may be specified along with an appropriate mask, which is required. This is the space/geometry where you would like to register your images. If these are the only files specified, all input images will be registered in this space.
2. Both an image in "native" scanner space and standard registration space may be specified. Each of these images must have a corresponding mask, and you must also supply a "_native_to_standard.xfm" giving the appropriate linear transform. For this specification, images in native and standard space will have the same orientation, but may have different bounding boxes. For the initial registration steps (e.g. LSQ6), input images will be aligned to the native space. Once this has happened successfully, subsequent stages (e.g. LSQ12/NLIN) will align files using the standard space. This option is what we use at MICe for ex-vivo brains, as their native orientation in the scanner is not the space in which we want to register them. After initial registration towards the native image, the native_to_standard.xfm is concatenated to that transform, bringing the images into standard space.

How to Specify an Initial Model

Whether you are using options 1 or 2 above, the command line option specified is the same:

```
--init-model=directory/image.mnc
```

Note that for this example, we have used the name image.mnc, but you can use any name you'd like, provided you follow the naming conventions described below. In all cases, the given file contains an image in standard space.

Whether you execute options 1, 2, or 3 depends on the other files contained in the same directory as image.mnc. Based on the files contained there, the code will know which option to use:

1. For option 1, you must include the files below in your directory. If these are the only files with the image prefix in the directory, the code will use option 1.
    a. image.mnc
    b. image_mask.mnc
2. For option 2, include the following files:
    a. image.mnc

b. image_mask.mnc
c. image_native.mnc
d. image_native_mask.mnc
e. image_native_to_standard.xfm

The specified naming conventions MUST be followed, or the code will not work.

To make initial models for option 2, consider this page: Creating an Initial Model.