C++ Xtensor Instructions:

First we need to install Xtensor, and Xsimd

* **xtensor** is a library for C++ that allows us to manipulate arrays and matrices much like numpy does, in fact it is based off of numpy so is you know numpy xtensor will be easy to use
* **xsimd** is basically a wrapper for xtensor that makes reduction calcualtions faster (Such as sum)

**xtensor:**

* conda install -c conda-forge xtensor

**xsimd:**

* conda install -c conda-forge xsimd

To make use of the xtensor library we have to include the appropriate header files for whatever functions you are using. Check out the xtensor documents for more information. To do so we need to Include the path to the xtensor, xtl (a sub-package of xtensor), and xsimd header files when we compile the code. To actually enable xsimd to automatically “speed up” the code (read more on that here) we have to include the lines:

* -mavx2
* -ffast-math
* -DXTENSOR\_USE\_XSIMD -03

to the compiler too. To get the path to the folders head over to your pkgs folder in anaconda3 and search for “xtensor” and “xtl” and “xsimd” and add the paths to your compile command. For example my path to the three are:

* /home/loicbeus/anaconda3/pkgs/xtensor-0.21.10-h0efe328\_0/
* /home/loicbeus/anaconda3/pkgs/xtl-0.6.21-h0efe328\_1/include
* /home/loicbeus/anaconda3/pkgs/xsimd-7.4.9-h0efe328\_1/include/

Compiling the C++ files in the terminal:

* g++ -mavx2 -ffast-math -DXTENSOR\_USE\_XSIMD -O3 -I /home/loicbeus/anaconda3/pkgs/xtensor-0.21.10-h0efe328\_0/include -I /home/loicbeus/anaconda3/pkgs/xtl-0.6.21-h0efe328\_1/include -I /home/loicbeus/anaconda3/pkgs/xsimd-7.4.9-h0efe328\_1/include/ PSF\_prep.cpp -o PSF\_prep
* g++ -mavx2 -ffast-math -DXTENSOR\_USE\_XSIMD -O3 -I /home/loicbeus/anaconda3/pkgs/xtensor-0.21.10-h0efe328\_0/include -I /home/loicbeus/anaconda3/pkgs/xtl-0.6.21-h0efe328\_1/include -I /home/loicbeus/anaconda3/pkgs/xsimd-7.4.9-h0efe328\_1/include/ Single\_Fitting.cpp -o Single\_Fitting
* g++ -mavx2 -ffast-math -DXTENSOR\_USE\_XSIMD -O3 -I /home/loicbeus/anaconda3/pkgs/xtensor-0.21.10-h0efe328\_0/include -I /home/loicbeus/anaconda3/pkgs/xtl-0.6.21-h0efe328\_1/include -I /home/loicbeus/anaconda3/pkgs/xsimd-7.4.9-h0efe328\_1/include/ Binary\_Fitting.cpp -o Binary\_Fitting

Run the main python script like so (Make sure python3 is installed, some systems if they haven’t been updated are still on python 2.7):

* python3 PSFfitting.py tinytim\_filename rnl\_filename