1135-65-180 **Zicong Zhou*** (zicong.zhou@uta.edu), 411 S. Nedderman Drive, 478 Pickard Hall, Arlington, TX 76019-0408, and **Guojun Liao**. *Medical Images Atlas by averaging Diffeomorphisms through Mesh Generation.*

As presented in [X.Chen and Guojun Liao, New Variational Method of Grid Generation with prescribed Jacobian determinant and prescribed curl] and [X.Chen and Guojun Liao, New method of averaging diffiomorphisms based on Jacobian determinant and curl vector], the new approach of averaging Diffeomorphisms is used in this work to find the image atlas of a group of medical images. The proposed average of diffeomorphisms is found by two steps. Firstly, averaging the Jacobian determinants and the curl vectors of all the given diffeomorphisms which can be determined from the given group of images; then, reconstruct an new transformation which is also a diffeomorphism that will be used in resampling an image. The resampled image is what we define to be the desired image atlas of the given group of medical images. In this work, the theoretical Mathematics will be demonstrated and several numerical results will be showed and discussed. (Received August 07, 2017)