Between Monday 20th November and Sunday 10th December 2017, I visited the INAF Osservatorio Astronomico d'Abruzzo in Teramo, Italy. Accommodation was provided by the observatory. The objective of this trip, as agreed with my director of studies, Prof. Maurizio Salaris, was to acquire and begin familiarisation of BaSTI, the FORTRAN-based stellar evolution modelling code which I will be using and modifying as the basis of my PhD research into chemical mixing in stellar interiors. Specifically, I will be modifying the code so that it incorporates the effects of thermohaline mixing, rotation and radiative levitation. In Teramo, I was provided with a computer work-station and was supervised by Prof. Santi Cassisi and Dr. Adriano Pietrinferni, who are both long-time experts in BaSTI and stellar evolution.

During my stay, I was first shown how to run the code and how to activate additional optional physical processes beyond the most basic possible version. I then studied how the code output changed as different fundamental stellar parameters, such as mass and metallicity, were fed into the model.

Most importantly, I explored the BaSTI code structure in detail, compiling lists outlining the purpose of each file and subroutine within each file, with particular regard given to the routines and subroutines which simulate the physical processes which I will be altering or adding to for my research. Since all but one of the source code files are headers storing subroutines (to be called upon in the last file), I spent a significant amount of time adding comments to the code to track the interactions between individual function and subroutines, in preparation for implementation of thermohaline mixing upon returning to LJMU – since returning, I have been able to confirm that the conditions necessary for thermohaline mixing are reproduced, in the correct interior locations and on significantly small timescales according to current theory, using the (modified) BaSTI code.