Acknowledgements

First of all I would like to thank my thesis supervisor Dr Kalpana Duorah and co-supervisor Prof. Ranjan Gupta for giving me the opportunity to work in the exciting field of astronomy and astrophysics. Their guidance, encouragement and personal care were always there during the whole period of my Ph.D work. My sincere thanks to Prof Ranjan Gupta and Prof. H. P. Singh, Delhi University, for giving me the opportunity to work on the project entitled “Development and application of artificial neural networks to stellar spectra and TAUVE data”. I would also like to thank ISRO for the financial support.

Valuable suggestions and comments by Prof. H.P. Singh and Prof. Jayanta Murthy, IIA, during the project work are gratefully acknowledged. I convey my sincere gratitude to Prof H.L. Duorah, former Vice Chancellor of Gauhati University (G.U.), for the continuous support, valuable discussions and encouragements. Thanks to Rekhesh, IIA, for providing me the TAUVE calculator generated data. The work of Chapter 5 of this thesis has been carried out under the guidance of Prof. Ranjeev Misra, IUCAA. It is my great pleasure to thank Prof. Ranjeev Misra for all the valuable discussions and support.

My special thanks go to Prof. N. Dadhich, Prof. A. K. Kembhavi, Prof D. Bhattacharaya, Prof G. C. Dewangan, Prof Vijay Mohan, and Prof S Ravindranath, all from IUCAA, for the help and support. I would like to thank
Sarah Ponrathnam and all computer center staff of IUCAA, without whose help it would have been impossible for me to accomplish this job. Special thanks to Nirupama U. Bawdekar and all the library staff for their constant help and support whenever I needed. Thanks to V. Chellathurai and all the administrative staff of IUCAA who took care of all the official formalities smoothly.

My four years of stay at IUCAA would not have been a pleasant and enjoyable one without the company of Dawood, my batchmate. Discussions and fights were frequent affairs, but, his guidance, encouraging words, care were also always there. I will remember his so called Assamese rhymes 'bi holo bolo.....' and many more. He also deserves a special thanks for proof reading this thesis with patience. I wish his sincere interest and love for Science will take him to new height.

Time was not favorable for me at the beginning of my PhD duration. I spent a very painful phase with my Dry Eye Syndrome. I am indebted to Dr. Sangeeta Wagh, Ruby Hall Clinic and Dr. Nilesh Uplenchwar, Deenanath Mangeshkar Hospital for the treatment, support and encouraging words at the moment of my anguish and utter frustration.

I take this opportunity to convey my sincere thanks to Prof. K Boruah, G.U for all the help and support. Encouraging words from all the faculty members, Physics, G.U., are sincerely acknowledged. Thanks to the administrative and academic staff of G.U. for the help.

My husband has been so patient all the time with my every decision, even with the most arrogant action too :-) He has always been there with his wider arms of help, support, care and encouragement.

I do not have any words to express my gratitude to Ma, Deuta, my In-laws,
Kakaideu, Luku, and other family members for their love and support

Last but not the least I wish to thank my friends and seniors, Ronid, Santosh, Samui da, Sanjit da, Humchand ji, Subharthi da, Mudit, Vinu, Vivek, Vidya, Jaya, from IUCAA; Khirud and Pranjal da from NCL, Pune; Hemendra da, Sidhartha da, Ananta da and Gitali from DRDO, Pune; Simanta, Jolly and Dipa from G.U and all my close friends and relatives