Acknowledgement

"In order to succeed, we must first believe that we can". - Nikos Kazantzakis

I am really very fortunate to have worked with so many brilliant people who helped me to learn a lot, both in academic and in life. At this moment I cannot proceed further without acknowledging the brilliance of such intelligent people. I also like to acknowledge the people without whom I would not have succeeded in completion of this work.

First and foremost, I would like to offer my gratitude and admiration to my supervisor Prof. Partha Pratim Sahu for his constant support, trust, valuable feedback, encouragement and innumerable advice. I am very thankful to him for his faith and belief in me and giving me the freedom to carry out my research. I will always remain grateful to him for his kind and supportive supervision and providing me the helping hands to successfully complete my work.

I also express my indebtedness to members of my Doctoral Research Committee, Prof. Jiten Ch. Dutta and Dr. Soumik Roy for their valuable suggestions to my research objectives in order to complete this work. I also like to thank Prof. Satyajib Bhattacharyya for his valuable advice to boost my morale throughout the course of my research. It is also my pleasure to thank Prof. Manabendra Bhuyan and all the faculty members of Department of Electronics and Communication Engineering, Tezpur University, Assam, for their guidance and persistent help during my research work.

I am truly thankful to Mr. Anukul Baishya and all the other technical staffs of the department for the valuable technical suggestions and providing me the lab facilities to perform my experiments during my research work.

Thanks to the technical staff and the office staff, Department of Electronics and Communication Engineering, Tezpur University, who are enthusiastically waiting for me to finish my degree and proceed towards a bright career. I take the opportunity to offer my gratitude to my fellow research scholars of the department, specially Jagat Das, Parag Kalita, Lachit Dutta, Champak Talukdar, Palash Phukan, Mukut Senapati, Abdul Barik, Pranjal Barman, Soma Chakrabarty, Kuntala Baruah, Rashmi Deka, Hilly Gohain Baruah, Helal Uddin Mullah, Rachinpha Hatibaruah, Rewrewa Narzary, and Anil Hazarika for their help and support throughout this period.

I would like to thank my friend Dr. Kishore Sarma and Dr. Biswajeet Talukdar, Gauhati Medical College and Hospital along with Dr. Sabnam Mam, GNRC, Guwahati, Assam, India, for their valuable medical suggestions and data in context to my research work. I also extend my thankfulness to Dr. P. Chattopadhayay, DRL, Tezpur, for his valuable suggestions during my experimental part on toad nerve model.

I am really blessed by the unending help, inspiration, understanding and constant urge from Smt. Rina Das (Maa), Dwipanwita Das Neog (Dangor Baidew), Jayanta Neog (Dangor Bhindo), Anamika Das Talukdar (Xoru Baidew) and Ankur Talukdar (Xoru Bhindo) to complete this work and stood by my side to pursue my dream. Both their support and my gratitude towards them are impossible to describe in words. I also cannot forget my niece Tanisha Neog (Mini) and my nephews Ryan Jyoti Neog (Dangor Babu) and Ansh Talukdar (Xoru Babu) whose love and smiling faces made me smile even at the time of hardships during the period. I feel very proud to be a part of the family.

I am very pleased to express my heartfelt gratefulness to my wife Mrs. Chayanika Saikia Das whose firm faith, love and valuable support helped me to find a positive route both in academic as well in life. Thank you so much for being a part of my life.

I also like to offer my sincere gratitude and acknowledgement to all the members of my in-laws who blessed me with their best wishes and words of encouragement. I would also like to acknowledge UGC-RGNF for providing me the financial support granting the fund (F1-17.1/2012-13/RGNF-2012-13-SC-ASS-14921) during my Ph.D tenure.

At the last but not the least, I would like to offer my sincere gratitude to my home institute Tezpur University.

Hemanga Kumar Das