## **ACKNOWLEDGEMENTS**

Foremost, I would like to express my sincerest regards and love for my father Sri Ram Bilas Poddar and mother Smt. Sumintra Devi for their constant support and love throughout my life. I will always be in debt no matter what I do, and I will always be your reflection.

Besides my parents, I would like to express my immense gratitude to my supervisor Prof. Satyabrata Jit and co-supervisor Prof. Rajiv Prakash for their excellent guidance and motivation. The completion of this research work is indeed an outcome of their constant untiring support, valuable ideas, and suggestions during my research work. The insightful discussions with them always provided me great enthusiasm.

I wish to extend my sincere gratitude towards my research performance evaluation committee (RPEC) members, Prof. V. N. Mishra and Dr. Bhola Nath Pal for their encouragement and insightful comments. I would also like to thank all the faculty members for their kind cooperation and encouragement during this journey.

I am grateful to my M. Tech. supervisor Dr. Ashis Kumar Mal for enlightening me for the further research.

I would like to express my special thanks to Dr. Hemant Kumar, Dr. Gopal Rawat, Dr. Balraj Singh, Dr. Ekta Goel, Dr. Sanjay Kumar, Dr. Yogesh Kumar and Dr. Sweta Chander for their valuable assistance from personal to the technical level.

I would like to thanks Dr. Divya Somvanshi, Dr. Purnima Hazra, Dr. Mirgender Kumar, Dr. Sunny, Dr. Kunal Singh, Dr. Anirudh Bahadur Yadav and Dr. Ashutosh Mishra for their fruitful suggestions.

I am very much thankful to many research scholars of the CRME laboratory for providing a stimulating and friendly environment. My thanks go to Mr. Lalit Chandra, Mr. Praveen Kumar Sahu, Mr. Smrity Ratan, Mr. Amit Kumar, Mr. Deepak Kumar Jarwal, Mr. Ashwini Kumar Mishra, Mr. Prince Kumar Singh, Mr. Kamalaksha Baral, Mr. Abhishek Kumar Singh, Mr. Abhinav Pratap Singh, Mr. Rishibrind Kumar Upadhyay, Mr. Deep Chandra Upadhyay, Mr. Manas Ranjan Tripathy, Mr. Ashish Kumar Singh, Mr. Vijay Kumar, Mr. Ashutosh Dixit and Mr. Sanjeev Mani Yadav.

I am indebted to research scholars, Mr. Gourav Modanwal, Mr. Subiman Chatterjee, Mr. Sudhir Bhaskar, Mr. Akhilender Pratap Singh, Mr. Vikram Kumar, Mr. Anshu Sharan Singh, Mr. Ashis Bahera, Mr. Rajan Agrahari, and Mr. Mayank Agarwal for providing a fun-filled environment.

My thanks and sincere appreciations also go to all staff members of CRME laboratory, especially to Mr. M. K. Saxena, Dr. V. K. Singh, Mr. L. Bahadur, Mr. S. Narayan, Mr. S. C. Yadav, and Mr. S. Srivastava for their kind co-operation.

I am indebted to some of my close friends, Mr. Shatrughna Kumar, Mr. Manish Kumar, Mr. Pankaj Kumar, Mr. Vivek Prakash, Mr. Abhishek Kumar, Mr. Ranjan Kumar, Mr. Saurabh Kumar, Mr. Hemraj Saurabh, Mr. Ashutosh Roushan and Mr. Sanjeev Kumar for their constant encouragement and support.

My most profound appreciation towards my sister and brothers for their continuous support and encouragement. They are the source of strength for me and remain an invaluable asset to me.

Finally, I heartily express sincere thanks to my big family. For their unconditional love, extreme patience and constant support over the years. They provide me strength and confidence to attain this task.

Above all, I thank Lord Vishwanath for providing me strength and courage in completing the work.

Date: 26 12 2018

(Chandan Kumar)

Chandan