

## ACKNOWLEDGMENTS

*In carrying out this PhD dissertation work, I have incurred many debts of gratitude and it is a great pleasure to be able to thank all those who have assisted in its successful journey so far.*

*At this instant of achievement first of all I want to shell out honor and hearty thanks with profound gratitude and indebtedness to my Supervisors **Dr. Neeraj Sharma Sir** (Associate Professor) and **Dr. Shiru Sharma Madam** (Assistant Professor) for their unremitting support and providing me an opportunity to pursue Doctoral Research work under them. They have encouraged me from the beginning of this endeavor. It would have been nearly unfeasible and an awkward work to achieve this task without them, those who have blessed me with their valuable guidance, innovative ideas, advices, constant encouragement, superb excellence and incomparable pioneering as well as technical qualities. They have supervised patiently, demonstratively and kindheartedly all throughout my PhD phase for which I do have no speech to deliver. Whatsoever, I have accomplished in my PhD programme is the solitary innovation of my supervisors who infused in me self-confidence to implement the sketch of this research work competently and by focusing towards the craving goal. They have cultured the blood of exploration in me. Their technical zeal and enthusiasm has stimulated me to accomplish any type of research job competently and dynamically.*

*On the individual front, my Supervisor **Dr. Neeraj Sharma Sir** has all the human good qualities, modesty, great philanthropic personality, headship traits, supportiveness, and forgiving in nature. His positive approach has blessed me with the quality of standing high and boasted. I feel proud to utter about my Sir, his creative nature, generosity of spirit, liberality, bond and individuality which are not equivalent to the second one. He is a man of excellence and shall continue to be an esteemed ideal for me. He is a paradigm for those who have endeavored to track liberal and amiable human behavior in their respective life.*

*Here, I take this opportunity to thank my Co-Supervisor **Dr. Shiru Sharma Madam**, for her insightful, prospective guidance, Philanthropic nature, comments, inexorable and unrelenting support, helpful and necessary crucial advices in right directions.*

*I would also like to express my deep sense of gratitude to **Prof. Nira Misra Madam**, Ex-Coordinator (during the year 2011) for permitting my admission to pursue PhD programme from School of Biomedical Engineering, IIT-(BHU), Varanasi.*

*I convey my thanks to my present day Coordinator, **Prof. A. K. Ray Sir** for his valuable support and help in pursuing the research work successfully in such a competitive atmosphere.*

*I am also grateful to **Prof. Ranjana Patnaik Madam** for her kind support and advices. I would like to acknowledge **Dr. Sanjay Kr. Rai Sir**, **Dr. Somdeep Dasgupta Sir** and **Dr. Sanjeev Kr. Mahato Sir** for their valuable supports, constant encouragement during this dissertation work.*

*I convey my thanks to **Dr. Neeraj Kumar Aggarwal**, Associate Professor, Department of Endocrinology and Metabolism, Institute of Medical Sciences, Banaras Hindu University, Varanasi for his expert guidance and observation during clinical studies.*

*I extend my thanks to my entire senior and Junior Fellow PhD Scholars and special thanks to **Anuj Srivastava Sir**, **Sanjay Saxena**, **Ankit Kajaria**, **Jitendra parihar Anuranjeeta**, **Monika Singh** and **Shilpa Jaiswal Madam** for their valuable and good company, fruitful discussions and for maintaining a productive research environment throughout my PhD dissertation work.*

*Moreover, a special note of thanks for all the office staffs specially **Mr. Parmathma**, **Mr. Sharma**, **Mr. Bharath**, **Mr. Mishra**, **Mr. Rajesh**, **Mr. Ajay**, **Mr. Kishori** and **Mr. Sharan** for their kind help and support during my stay at Varanasi.*

*I would like to acknowledge, **University Grant Commission (UGC)**, India for providing me financial assistance in form of **Senior Research Fellowship (SRF)**. I am also thankful to **MHRD** and **IIT (BHU)**, **Varanasi** for providing me the financial assistance in the form of **Teaching Assistantship (TA)** for pursuing my PhD programme here.*

*I would like to convey my thankfulness to all hardware and software providers, as without their involvement and applications it is impractical to complete the PhD dissertation work.*

*The people, who cultured inspirational feelings in my life, are those who gave birth and brought me up. They cared for to provide me the real values of human beings, sympathy and humanity. They are my real natural mentors who sacrifice in order to bring me to this present situation and blessed me with their loveliness and warmth.*

*Those people are none other than my beloved parents **late. Md. Sahajahan and Late. Karabi Das.** I pay my sincerest obeisance to them. I think they would be the happiest persons in this world to see their son holding the PhD degree. But by the irony of fate, they both died in the mid way of my PhD carrier. May **God Almighty** rest there heavenly souls in ultimate satisfaction and peace.*

*I am invariably lack words to express the support, patience and encouragement rendered by my wife cum soul partner **Moli Moitra Chowdhury** for me during pursuing this PhD programme. She forfeited and suffered the most to provide me an opportunity to pursue this Doctoral programme. However, without her constant love and support, this achievement would have been impractical. I wish to express my fatherhood feelings to my little son **Karanjeet Chowdhury**. With his single smiling word '**Baba**' provides me the immense strength to fight against all the odds in my life. I wish to convey thanks to my younger brother **Sagnik Choudhury** for providing me the mental support and strength in pursuing this Doctoral research work.*

*Last, but not least, my head bow in praying reverential attitude towards the **God Almighty** for Her endless blessings and showing the right pathway towards achieving the true nectar of my life.*

**Md. Koushik Chowdhury**