Acknowledgements

One thing that causes unnecessary stress for many doctoral candidates is writing their dissertation acknowledgements and I am no different. Dissertation is logical point of the long and enduring journey every student with an aspiration of achieving Ph.D. takes on. I too had an interesting journey and definitely never worked in a vacuum to not give credit and remembrance to all those who have been part of this journey along with me.

Any ship stuck in maelstrom always seeks the light of the beacon shinning on the shore to guide and show the path and lead to safety. No dissertation can ever exist without the eminence of one's Ph.D. Supervisor, though the word itself fails to bestow the significance of the person's influence in the student's life. He is not only Ph.D. Supervisor but a mentor under whose tutelage a student undertakes the journey and emerges as qualified subject matter specialist. My journey won't have started without the presence of Professor **A. C. Sharma**, who gave the opportunity to a simple M.Sc. student like me to take up the wonderful subject of Graphene. I would like to express my sincere and heartfelt gratitude to Professor Sharma for everything I learnt and gained over the tenure of my Ph.D. work.

Every student during their Ph.D. dissertation comes across a mentor other than their Ph.D. Supervisor, who is as eminent and as valuable as the Ph.D. Supervisor. I would like to express my most sincere and heartfelt gratitude to **Professor P.K**, Jha, Physics Department Faculty of Science, MSU Baroda, who had motivated me when I was down, guided me when I was going in wrong direction, helped me when I was lost. Professor Jha never hesitated in taking my call and sorting the issues out. I couldn't have completed my dissertation with the constant guidance from Professor Jha.

I would like to make a notable mention of **Professor J. P. Singh**, Physics Department, Faculty of Science, MSV Baroda,, who helped me in understanding the nuance of mathematical modeling and implementation using which I was able to use in my theoretical analysis.

I would also like to thank ex-Prof. Vijay Pothbhare, Applied Physics Department, Faculty of Engineering and Technology, MSU Baroda for constant help and inputs provided during my work on the subject.

I would like to thank **Dr. Aruna Bajpai**, **Dr. Pushpendra Tripathi** and **Dr. S.S.Z. Ashraf** for their respective contributions towards my work.

I would like to acknowledge University Grants Commission, Delhi for providing scholarship through UGC-RFSMS research scheme.

Moreover I would like to thank all the teaching and non-teaching staff of Physics Department for all the help rendered by them.

I truly value contribution from **Dr. Sejal Shah**, Assistant Professor at Mathematics department, MSU Baroda, in completion of my thesis. She has been a pillar of strength throughout my work. Thank you so much Madam for standing by my side through all ups and downs of my research and motivating me every time we met. I'll always cherish your support and moments spent with you be it our discussion on mathematics involved in my work, coffee-breaks and many more.

I would like to mention special thanks to **Sudhanva Lalit** and **Yashwantsingh Chauhan** for their selfless advices and discussion on my work. They were always ready to discuss and provide support and feedback whenever needed. Thank you folks for spending time and being there in my difficult times.

I would take this opportunity to mention my appreciation to **Rimjhim Bhatnagar Singh** for always-be-ready to talk to me over phone and our CCD visits are unforgettable.

I would like to thank my friends **Dr. Usha Joshi** and **Darshan Desai** for listening, offering me advice and supporting me through this entire process.

No journey of 7 years with dissertation in such an interesting field can always have its highs. There were pits of darkness when frustration overtook me and this time my sister like friend **Ms**. **Roshni Gill** always cheered me up. Talking with her was like elixir of life to the tired brain. All her call, spanning few minutes or many hours, would cheer me up and would leave me in state of happiness. Dragging me out to bring change to my personal surrounding, she would always be ready to accompany me to movies, malls and shopping. I would like to thank you from the bottom of my heart for believing that I can complete this dissertation work. Along with Roshni, my friend circle of Sagar Patel, Sukumar Burman, Nishith Patel, Tanmay Shukla, Purvi K, Patel, Shruti Potbhare Shukla, Prajakta, Meghna Vegda Vania and Krutagyna R. Vasava whom I had cherished since my school days, provided support despite being spread across the world. I really cherish them and will always keep them close to my heart.

With every downfall, god has a plan and a solution to the problem. One of my lowest phases led me to climb stairs of Yogniketan, Baroda. I have drawn a deep sense of stability and love from our **Pujaniya Guruji Brahmavilin Dr. Shri Vishnu Prasad Acharya** who had been indispensable to my progress, and all his love and auspicious blessings. My yoga gurus **Mrs. Mita Patel** and **Shri Minesh Dabhi** for inculcating values and knowledge of yoga in me. The centre gave me some unforgettable valuable friends for lifetime who provided moral support during worst phase of my work. Thank you **Sushma di, Jigna di, Parul Sangani, Monika Valand** and **Meripelly Praveen Goud** for being with me whenever I needed you all!!!

There was a time when I had lost all my confidence in myself and the situation and that's when I meet **Mr. Parimal N. Gandhi**, Managing Director of Academy of Human excellence, Baroda. Interactions with him really boosted my spirit and made me believe, I too have a place under the sun and I too have a part to play in the betterment of humanity. Thanks sir for showing an alternate perspective towards life, teaching me of handling difficult situations in life. The SOL-2 and ACRES left me with some valuable teachings from him which helped me to overcome the stress during remaining phase of my thesis.

Along with Parimal Sir, I would like to thank the faculty at Academy. Mrs. Kanchan Karunakar, Mrs. Radhika Iyer Talati, Dr. Purvish Parikh for leading me to the path of optimism.

The penultimate phase of my thesis writing brought some amazing friends in my life. I would like to cherish one and all in "Academy: Enriching life" group on Whatsapp. With beginning our day with very optimistic thoughts gradually converting into our craziest group discussions and leg pullers for someone or another and concluding with some amazing messages at the end of the day. Thank you all for being a part of my journey!!!

I am nobody and would have no existence, if not for my parents, Shri Narayan Dutt Mishra and Smt. Sunita Mishra, who have been my heart and soul throughout my life. They taught me everything about life, pushed me to follow my dreams, gave me freedom to do what I wished to

do. Throughout my life, they have been my engine powering me with great values, love and support. In my moments of insanity they were always showering their wisdom on me, making me realize how trifle my worries were. The amount of emotions I feel for them is no match to all the words in the all the language of the world, hence I would simply join my hands and bow my head in respect to them.

In the end I would like to mention about my brother **Abhishek Mishra**, one who had been always patient with me despite of my umpteen efforts to annoy him. My Big B, who always teases me, makes me think 5 steps in the future when I am stuck in present and who always tries to make me laugh with his stupid PJs. Thanks Bhai!!

To all my heaven-sent angels, thank you and God bless us all !!!

Mishra Kavita N.