Acknowledgments

I would like to thank all the people who contributed directly or indirectly to the work described in this thesis. First and foremost, I thank my academic supervisor, Professor Anish Mathuria, for accepting me in his group. During my tenure, he contributed by giving me intellectual freedom in my work, supporting my attendance at various conferences, engaging me in new ideas, and demanding a high quality of work. Also, I would like to thank my committee members Professor Ashok Amin, Professor Manik Lal Das and, Professor Sourish Dasgupta for their interest in my work. I specially thank to Prof. Manik Lal Das who have shaped my thinking about this research direction. Additionally, I would like to thank our collaborators Professor Kanta Matsuura, and Dr. Takahiro Matsuda at University of Tokyo for their valuable suggestions in the initial phase of my research work. I would also like to thank Professor R. Nagaraj, Professor Suman Mitra, Professor Sanjay Chaudhary and Professor Mehul Raval for their financial and mental support through various means during my tenure.

Every result described in this thesis was accomplished with the help and support of fellow lab-mates and collaborators.

I would also like to say a heartfelt thank to my family for always believing in me and encouraging me in whatever way they could during this challenging period.

Naveen Kumar
May 2017