

## *PREFACE*

This thesis is being submitted in fulfilment of the primary requirement for the degree of Doctor of Philosophy in Science of the University of Calcutta.

The work leading to this dissertation has been carried out under the direct supervision of Dr. Uttam Bandyopadhyay, Professor, Department of Statistics, University of Calcutta. I am deeply indebted to our venerated teacher Prof. Bandyopadhyay in many ways. Ever since I joined as a postgraduate student in this department, I have enjoyed his precious advice and favour. Getting an opportunity to work with Prof. Bandyopadhyay is indeed an achievement to be reckoned with. It is a matter of great pleasure to acknowledge that his incessant inspiration and dynamic insight make me very passionate in this subject. I must applaud and appreciate his intellectual and potential guidance that, during my research, has benefited me immensely.

I am grateful to the Department of Statistics of Calcutta University and to my respected teachers of this department for their valuable offerings in acquiring knowledge in the subject. During my research, I have availed various amenities from the department. The staff members working in the office and the library display their enlarging gestures whenever required. My friends among the scholars of the department including seniors, my contemporaries and juniors, are all very supportive and generous. My memory shall remind me forever all the happier times I spent with them as a research fellow. I am also benefited by Calcutta Statistical Association in many ways.

I express my sincere gratitude to my teachers in St. Xavier's College, Kolkata-700016, India. In St. Xavier's, I spent ecstatic days as an undergraduate student of Statistics (Honours) along with Mathematics and Economics as subsidiary subjects. There I came across several outstanding faculty members in all these three disciplines.

It was my privilege to become a member of the first batch of Statistics (Honours) of St. Xavier's. That newly formed Statistics (Honours) Department had then few teachers of extremely high quality and caliber. They successfully motivated us in Statistics and as a result, more than one third of the first batch later turn into active researches in Statistics. In the very beginning of my career with Statistics, veteran Prof. Atindra Mohan Gun, Dr. Utpal Kanti Dasgupta, dedicated and devoted Prof. Amit Kumar Ghosh, along with young and dynamic Dr. Indranil Mukhopadhyay nurtured me.

I must specially mention that I am and shall remain forever, a fervent admirer of Prof. Gun. A vibrant personality filled with magnanimity and munificence, Prof. Gun has left a deep influence in me. He immensely helped me in understanding the elementary Probability theory and the fundamentals of Statistics. It is his good counsel and encouragement, which helped me in deciding to continue with Statistics, even leaving a high profile media job. At the very outset, the thought provoking lectures of Prof. Amit kumar Ghosh, Head, Department of Statistics, St. Xavier's college have turned my mindset much more application-oriented.

I like to thank Dr. Atanu Biswas, Associate Professor, Indian Statistical Institute, Kolkata, for his help and inspiration all these years. Thanks are also due to Dr. Barendra Purkait, Director, Geological Survey of India, Kolkata, for providing interesting field data related to arsenic contamination and motivating me in working with Geostatistical issues.

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Though last but not the least of importance, I convey my regards to my parents, love to my younger brother and to all those who only stand and wait. In fact, my brother Avik has the extreme proficiency in computer management, both in hardware and software sectors. This provided me an excellent atmosphere and opportunity to nurture and upgrade my computing skills at home.

I deeply regret if there are any errors of unintended omissions and commissions.

*KOLKATA*

*JULY-20, 2007*

*AMITAVA MUKHERJEE*