Physics Is Like Sex. Sure, It May Give Some Practical Results, But
That's not Why We Do It.

-- Richard P. Feynman (1918-1988)
ACKNOWLEDGEMENTS

I would like to take this opportunity to thank my supervisor, Prof. H. B. Bohidar, who inspired me to work in this novel field. Carrying out experiments of this magnitude would not have been easy without the timely help and valuable suggestions from him who made them look simpler than they were actually. In fact he has been more like a friend to me than a supervisor, and I have learnt a great deal in his company.

It is worth mentioning that, apart from him, I have learnt enormously from other faculty members of School of Physical Sciences (SPS) as well. Thanks to Prof. R. Ramaswamy for his constant encouragement and support. Financial support from the Council of Scientific and Industrial Research (CSIR), India during the tenure of research is also duly acknowledged. I am grateful to IUC-DAEF (Inter-University Consortium for Department of Atomic Energy Facilities) and DST (Department of Science and Technology), India for bearing the expenses of my visits to Mumbai and Switzerland for neutron scattering experiments. I am also grateful to Paul Scherrer Institute, Switzerland and Bhabha Atomic Research Centre (G.T Lab., DHRUVA research reactor), Mumbai for providing SANS facilities.

My special thanks goes to my two Collaborators Dr. V.K. Aswal (BARC, India) and Dr. Joachim Kohelbrocher (PSI, Switzerland) for the SANS data analysis and needful helps I got from them in their lab. Thanks to Prof. Kishan Dholakia (Optical Trapping Group, University of St. Andrews, UK) for his valuable guidance in my research work.

I would like to thank my old and recent labmates (Dr. Anita madam, Sharmaji, Mazin, Somak, Amarnath and Santinath) who supported me constantly in my research work. I would like to express my deep sense of gratitude towards the old and recent students (Tyagibhaiya, Rashid, Sunil, Awaneesh, Pramod, Joyce, Vandana, Anuja, Ruchi, Sruthi, Amitav, Prabhat, Bhaskar, Indrajeet, Kausik, Vinayak, Manishji, Sandeep, Sekhar, Omprakash, Khuramda and Niladriji) and staff (Narendraji, Rishiji, Jagmohanji, Martinji, Prasadji, Vargheseji, Tikaramji and Jaganathji) of SPS for their help and cooperation during the course of my thesis work. I have also special thanks to N. Goswami and Santosh for their help in AFM data analysis. From the beginning of my life at School of Physical Sciences, I felt rather homely than a research student. It would be unfair if I do
not mention the role of all of my friends including my Jai-Jai group (Santosh, Surya, Kunu, Muna, Papu, Bibhuti, Subash, Chinu, Jubula, Bhaskar, Bibek, Kailash, Suju, Bishnu, Vinod, Nandi, Tusar, Gopalbhai, Sunil, Ajubhai, Dipubhai, Namu, Baby, Sadabhai, Prabirbhai, Vincent, Raja, Sambit, Tila, Pintu (2), Sibashish, Prashant, Pabitra, Rajkumarbhai, Kapilbhai, Biren, Gyana, Sumanta, Subrat, Jena, Vinodbhai, Amitavbhai, Chitanana, Bhagiabhai, Hanu, Kamala and Neeraj) who made the rigorous task of research an enjoyable experience and my stay at JNU a memorable one.

I have no words to express my regards for my father Sri Hrudayanidhi mohanty and mother Smt. Kiranbala Mohanty to whom I owe everything in my life and to whom this thesis is also dedicated. Dada Sri Chandrasekhar Mohanty, Khudi Smt. Sujata Mohanty, Younger brother Silu, Brother-in-law Babi, Sisters Jhili, Mili and Deepa have been constant source of encouragement and moral support throughout my life. I am also indebted to my Dadabou and Late Mamujeje for being source of inspiration behind success of my life. Last but not least, the cheerful smile of my youngest brother, Baba has always guided me to a happy and enjoyable life all through.

Biswaranjan Mohanty
Biswaranjan Mohanty