Acknowledgements

First and foremost, praise and thanks goes to my savior Jesus Christ for the many blessing undeservingly bestowed upon me.

More than any others, my interaction with five individuals has shaped the way I think as an engineer:

- Professor James K. Mitchell, University Distinguished Professor, Emeritus, Virginia Tech.
- Mr. Asadour H. Hadjian, Senior Technical Staff, US Defense Nuclear Facilities Safety Board.
- Professor William J. Hall, Emeritus Professor of Civil Engineering, University of Illinois, Urbana-Champaign.
- Dr. William F. Marcuson, III, Emeritus Director, Geotechnical Laboratory, US Army Waterways Experiment Station.
- Dr. Robert Ebeling, Information Technology Laboratory, US Army Waterways Experiment Station.

I feel extremely privileged and grateful for their tutelage, mentoring, and friendship. If anything contained in this thesis is deemed meritorious, it most assuredly can be attributed to the lessons of these individuals; I alone take credit for the less than meritorious content. Particularly, my sincere gratitude goes to my advisor, Dr. James K. Mitchell, for his guidance, encouragement, and tremendous patience during the course of this research, without which the completion of this work would not have been possible. I am proud to be number seventy two.

The author also extends his gratitude to the other members of his advisory committee who provided advice and guidance: Professors M. Gutierrez, T. Kuppusamy, J.R. Martin, S.F. Obermeier, and M.P. Singh. Although not committee members, the dedication of Professors J.M. Duncan and G.M. Filz to the students and the Department of Civil Engineering is gratefully acknowledged.
Professors Ricardo Dobry and Thomas O’Rourke acted as the MCEER reviewers for geotechnical research and provided valuable comments throughout the commencement of this research. Drs. Carmine P. Polito, Joseph P. Koester, and John A. Bonita generously provided the laboratory data used in this research, while Carmine patiently taught me the finer points of laboratory testing.


Through the wonders of the internet and e-mail, I was able to correspond with numerous individuals from around the world who graciously provided me with references and/or information used in this thesis: J.L. Figueroa, E.V. Leyendecker, R.D. Borcherdt, J.M. Hagerty, A.E. Holeyman, F. Ostadan, B. Muhunthan, R.J. Fragaszy, F. Fernandez, M.D. Trifunac, J.M. Roesset, J. Kuwano, T. Kagawa, and K.T. Law.

My experience at Virginia Tech was greatly enhanced by the interaction with other students. Youngjin Park’s integrity and work ethic was both inspiring and humbling. The numerous discussions with Wanda Cameron, Carmine Polito, Miguel Pando, and Guney Olgun greatly increased my understanding of geotechnical engineering. The friendship of Trish Gallagher, Jeremy Britton, Jeff McGregor, Aaron Muck, Chris and Diane Baxter, and many others in geotech group made the stressful times more bearable.

Youngjin Park and William White got my research back on track after being plagued with computer problems. Additionally, William White painstakingly proofread large portions of this thesis.

Finally, the love and support of my wife, Chris, and son, Owen, turned any fears of failure into desires to succeed. Thank you.