

## **Grant Information**

This work has been sponsored by the National Science Foundation Graduate Research Fellowship Award Program. Other sponsors of this work include the Air Force Office of Scientific Research (AFOSR), the Air Force Research Laboratory Directed Energy Directorate (AFRL/DE), the Virginia Space Grant Consortium, and the Honeywell Corporation. The author gratefully acknowledges the financial support.

For my family,  
past, present, and future,

and especially for my wife,

Jennifer,

without whom this dream would not be possible.

## Acknowledgements

The successful completion of this work was brought about by a number of people. Firstly, I would like to thank my academic advisor, Dr. Daniel Inman, for his continued guidance and financial support over the past three years. Dr. Inman has been a mentor and colleague, a unique trait that sets him apart from others. Further, his sense of humor and positive perspective on life has helped through the ups and downs of graduate work over the past four years.

I would also like to thank my committee members, Drs. Donald Leo, Harry Robertshaw, Eugene Cliff, and John Burns, for their help and assistance throughout my research. I would especially like to acknowledge the time and tutelage of Dr. Burns, who inspired me to learn more about distributed parameter systems, finite elements, and functional gain analysis through his Calculus of Variations class. Dr. Burns, like Dr. Inman, has a wonderful perspective on life and research, and learning from him was quite an honor.

As part of my introduction to the mathematics world over at the Interdisciplinary Center for Applied Mathematics (ICAM), I was introduced through Dr. Burns to Dr. John Singler. John taught me just about everything I know about finite elements and approximation techniques for distributed parameter system control problems. He wrote many of the kernel codes for computing the finite element matrices generated in the present research, and without his help, I'd still be wondering what a test function is. John's friendship and guidance from the mathematical perspective were truly inspiring, and I am quite honored to have worked with him.

A special word of thanks goes out to Dan Marker and Dr. Mike Wilkes at the Air Force Research Laboratory Directed Energy Directorate (AFRL / DE) in Albuquerque, New Mexico. I first met Dan at an AIAA short course on gossamer structures, and subsequently set up a tour of his membrane optics facility at Kirtland AFB. From the meeting, a great working relationship was kicked off, and eventually I was introduced to one of Dan's colleagues, Dr. Mike Wilkes. Mike and I enjoyed many a long email to

## **Acknowledgements (cont.)**

each other trying to sort through the issues of membranes backed by shallow cavities, transformation of the Zernike polynomials, and other membrane optic topics that no one else in the world seemed to care about except for us. Mike has since retired, and I wish him the best in his latest endeavors.

I would also like to thank my colleagues at the Center for Intelligent Material Systems and Structures. It has been a fun four years, and the people are what make the difference. I'd especially like to acknowledge Beth Howell, for taking care of all my financial questions and travel, and the assistance garnered from all of my labmates.

Next, I'd like to thank my parents for their continued love and support. They instilled in me early on a sense of initiative, pride, and dedication to excellence that has carried me these past few years. I'd also like to acknowledge all of my friends and family, both near and afar. Forming close friendships here through St. Mary's church with other young couples has really sustained my love for life these past few years.

Last but not least, I'd like to acknowledge the love, support, and patience that my wife Jennifer has given quite freely to me for four years now. It's not too often that a person starts graduate school and married life concurrently, but that is how our life together began, and Jennifer has stuck it out with me and provided the support needed at home to be able to make it to the finish line. Her unconditional love and support are second to none, and have been truly exemplary. Starting our family life together recently has been quite a blessing, and has given me added drive to continue to succeed. Although my name will show up on the degree, it really should be both of our names. Thank you, Jennifer, for sticking with me and for helping me find success. May God return your generosity and love a thousand fold throughout all our life together.