Acknowledgments

I consider myself very fortunate to having been given the opportunity of working with my advisor, Yechiam Yemini (YY). This small paragraph cannot make justice to his incredible guidance and friendship. As an advisor, he inspired and challenged me with his brilliant knowledge, wisdom, and intuition. This work would not have happened without his creative ideas and extraordinary assistance. As a friend, he has helped me through countless difficulties. I am forever in debt to him. I will strive to account for the time he has spent educating me.

I am in debt to my former advisor and friend, Calton Pu. I will never forget his advice and supervision.

I am most thankful to my thesis committee, Daniel J. Duchamp, Steven Nowick, Thomas Stern, and Charles A. Zukowski, for their outstanding comments and suggestions on this work. I feel very fortunate for having had this work evaluated by such group of outstandingly bright and dedicated researchers.

I thank Ron Erlich for his help with the implementation of the switch. I thank Rahul Sood and Gong Su for their help in building a demo video application using the switch.

I thank the Brazilian Research Council (CNPq) grant 204544/89.0 for their generous support during the first four years in the program.

I thank many current members of, former members of, and visitors to the Distributed Computing and Communications (DCC) Lab for uncountable valuable discussions, helpful insights, and great friendly times. These include Timothy Balraj, Apostolos Dailianas, Al-

exander Dupuy, Ashutosh Dutta, Hong Liu, and Sushil da Silva. I would also like to acknowledge the other DCC members for their great friendship.

I thank our chairman Zvi Galil. The department has been very fortunate for having had his guidance and perceptiveness.

I thank Susan Tritto for her incredible friendship and great help in making me understand complicated bureaucratic procedures at Columbia. I thank Germaine L'Eveque and Mel Francis for their friendship, their worm reception when we arrived in the department, and their support throughout these many years at Columbia.

Many Faculty members helped me with friendship and intelligent discussions: Shree Nayar, Sal Stolfo, and Thanasis Tsantilas.

I was fortunate to find many friends in the department and I thank them too.

I am forever in debt to my friend, office mate, program mate, discussion mate, and, most importantly, wife, Patrícia Gomes Soares Florissi. This thesis and many other steps I had to go through during my Columbia years would simply not have happened without her incredible support, help, and patience through most difficult and worrisome times. I cannot thank her enough, but I will start by dedicating this work to her.

I am most fortunate to have had the love, support, and endurance of my family during these many years apart. I am most thankful to my mother Adriana, my father Sergio, my brother Aldo, and my sister Susanna. They must take the credit for making me who I am today. I am also most thankful for my mother-in-law Hercília and my father-in-law Waldecy for their outstanding help and understanding.

I thank God for His help through this challenging task. I could not have climbed this difficult step without His upholding thrust.