Acknowledgments

Life is a journey, not a destination. It is a long, long journey, so long that you cannot even see what is in the distance. It is because you cannot have a clear look beyond the corner of the road ahead, you keep a hope, a sincere hope, a hope that is deep in your heart. It is because of this hope that you hold on tight to your faith. You keep walking when blisters are popping up from under your feet. You get back on your feet when you fall into the thorny bushes. You fight against the rapids when you are turned over in a turbulent river. In the meantime, you are blessed to have the loyal Big Dipper guide you towards the right direction, to have sweet dew quench your thirst, and to have beautiful rainbows decorate the sky along your quest. Finally, at some point, you are happy to realize that you have arrived at a place, where you turn back and find out that all you have gone through has turned into a magnificent view - a living jungle stretching towards the horizon with a jade-green river winding through. You smile into the distance and you find out your world is celebrating with you under the sun.

You should spend a night there: watch the sunset, enjoy the dark blue sky, have a sweet dream, and embrace the sunrise to start another day. Where should you go? You do not know. The jungle in front is filled with uncertainties. But your instinct whispers about something in the distance through the mist of the dawn. There may be the excitements. Where are you from? It is right there. The jungle behind you has shaped you into who you are. So take some time, take a break, seize this moment, do not let it pass too quickly. There are the memories, the experience, the wisdom, and the smiles. Collect them and carry on.

After four years as a PhD student at Columbia, I am so happy to look back and see that the journey I have just had is filled with so much happiness and so many wonderful people that I am grateful to. It has shaped me to who I am today and has brought me to such a wonderful place
where I can appreciate the beautiful picture woven by every day and night of these years. So I take this moment, take a deep breath, to recollect all the wonderful memories from these past few years and to thank everyone who has helped me along the way.

First and foremost, I would like to thank my parents, Shengyong Dang and Shuzhi Gao, who brought me into this world, taught me to walk, to speak, to express myself, to communicate with others, and most importantly, to have the courage and patience to be myself in this ever-changing world. There is nothing more important than having an optimistic outlook towards life. I thank them for instilling this important attitude in my mind and supporting me unconditionally throughout the past years.

During these years as a graduate student at Columbia, one of the most influential people has been my advisor Prof. Peter K. Allen: energetic, charismatic, sincere, and always ready for challenges. Every graduate student in their life needs someone who is knowledgeable enough to show them the big picture of a research area, objective enough to evaluate their work, sincere enough to tell them where they stand in their field, and generous enough to offer help. It is a blessing to have one of them, while Peter is a combination of the four! I have learned a lot from Peter, which has enriched me in the past years and brought me to where I am today. I believe it will continue to benefit me in many years to come.

At Columbia, I was lucky to have my time overlapped with my lab mates: Matei Ciocarlie, Corey Goldfeder, Austin Reiter, and Jonathan Weisz. Matei was the first PhD student I met in this lab. He guided me through my first project and led me into the field of robotic grasping. In my first project, Matei and I worked with Professor Marco Santello and Jamie Lukos. I would like to thank both of them for the fruitful collaboration and their hard work to perform the experiments. Matei and I also worked closely with Corey on the Columbia Grasp Database project. I have been always impressed with Corey’s deep understanding of templates in C++ and his creative thoughts about our project. In the robotics lab, Austin and Jon are the two students with whom I overlapped most of my years as a PhD student. I truly appreciate Austin’s useful advice and suggestions when I needed help as a foreign student. I have always enjoyed having lunch and dinner with Austin and enjoyed trying to trick him into eating chicken feet (the success rate remains embarrassingly
0% \pm 0 so far, but who knows what will happen in the future? - we will improve our algorithms in our future work!). Jon is a very smart, diligent, and resourceful friend as well as colleague. He is always curious about new things and he is a quick learner. He is also always willing to help others. I enjoyed working with him on DARPA’s ARM-S project.

The first project I did for my PhD research was teaching a robot to do everyday object manipulation tasks. Prof. Steven Feiner was very supportive in lending his motion capture equipment to help me with my experiments. I want to thank him for his kind help and ardent support.

During the years of 2010 and 2011, I spent two wonderful summers at Bosch Research and Technology Center North America and SRI International, both of which are located in California. At Bosch, as part of one of the first eleven teams to receive a PR2 robot, I had a great time visiting Willow Garage for the PR2 workshop, where I met Matei again, who was then a research scientist at the company. Those two summers were precious experiences for me. I would like to thank Charles Duhadway, Benjamin Pitzer, Jan Becker from Bosch and Motilal Agrawal, Aravind Sundaresan, and Robert Bolles from SRI. Without them, I would not have had such wonderful internship experience. I truly enjoyed working with Moti, Aravind, and Bob in the ARM-S project. I have been always impressed by their kindness, creativity, diligence, and dedication.

Looking back on those days in California, I realize now how lucky I was to have so many wonderful friends who were so reliable and generous to offer help to have me settle down with no effort. I would really love to extend my gratitude to Ji Fang, Hui Qiao, Lei Li, and Hao Su who were in California during that time. I would also like to thank other friends with whom I had wonderful trips: Jinai A, Jun Hu, and Lin Yang. I still remember the day when I led my friends to the wrong way at Lassen Volcanic National Park. We walked three extra miles in the end but it actually brought us to watch an unexpectedly beautiful sunrise in the west coast of the continent (what a surprise indeed!).

I would also like to thank many other friends: Chonglin Zhang, Kaushik Viswanathan, Weiwei Guo, Wei-Chun Yuan, Thomas Berg, Jiongxin Liu, Daye Lin, Tao Xiong, Dakai Li, Ruiyang Wu, Lifeng Hu, Guannan Gong, Peng Liu, Cheng Niu, Jia Liu, Yiding Cheng, Xin Li, Lesi Li, and Jing-Yeu Miaw. It’s been my pleasure to have a friend in each one of you and I have enjoyed the
moments we share together.

Having spent the past six years in the computer science department, I feel greatly honored to be part of the family. I owe a debt of gratitude to all the staff members of this department. I want to specifically thank Anne Flemming, Cindy Walters, Remi Moss, Lily secora, Jessica Rosa, Elias Tesfaye, Twinkle Edwards, Patricia Hervey, and Evelyn Guzman: without you, we would not have had such a big wonderful family.

Countless people have walked into and out of my life, to whom I am grateful. I cannot name every one of them, but I would love to take this opportunity to thank all the people who have ever walked into my life, left their footprints, and lent me a helping hand - because of you, the world is changing.

I feel fortunate to have spent six years of my life at Columbia, in this amazing city, with so many wonderful people. While life is not all about moving on - we all need to rest, appreciate, and anticipate, yet it is time to go, to start another chapter of my life. It looks just like six years ago when I first arrived in New York City: everything smells so fresh, so uncertain, yet so exciting. I take everything I have harvested here as a blessing and pack them all into my backpack as my source of inspiration along my journey ahead.

As the song goes, “We met. We laughed. We held on fast. And then we said goodbye.”

Thank you so much!

Hao Dang
New York City, NY
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Life is here to enjoy ...