

Acknowledgments

One of my favorite books, Martin Buber’s philosophical masterpiece *I and Thou* (*Ich und Du* in German), distinguishes between two fundamental modes of human existence. While the modern world is largely defined by the “I-It” relationship, characterized by interactions rooted in utility, transaction, and exchange, there exists a profound alternative: the “I-Thou” encounter. This rare connection is built on genuine presence and mutual recognition, where individuals truly *see* one another, sincerely wish for each other’s well-being, and unconditionally rejoice in each other’s triumphs. Throughout the arduous journey of my PhD, I have been deeply privileged to share this “I-Thou” bond with a select few. They have supported me immeasurably, not out of obligation, but out of pure sincerity. As I reach the culmination of this endeavor, I know they share in the joy of my success just as genuinely as I offer them my deepest gratitude here.

First and foremost, I owe my deepest gratitude to my parents, Liqun Cheng and Chunmei Zhang. As their only child, my decision to pursue a PhD on the other side of the world demanded an extraordinary sacrifice from them. We have barely seen each other over the past five years. Their willingness to endure this long separation, coupled with their unwavering support from afar, has been my greatest source of strength. Words cannot fully capture how much their silent sacrifices mean to me. I firmly believe they are deeply proud of all that I have accomplished, which is the best return I can offer for their boundless love.

It is difficult to fully express my profound gratitude to my advisor, Dr. Bo Han. If I must use one sentence to express it, I would say choosing to pursue my PhD under his mentorship was undeniably one of the best decisions of my life. What I have gained from this journey goes far beyond a collection of papers and citation counts, which are merely the standard metrics of the academic world. The far greater treasure has been the complete and rigorous training I received under his guidance. Time and again, I experienced the entire research life cycle: from independently confronting an entirely novel challenge and exploring the boundaries of possible solutions, to leading a team through effective communication, and finally presenting our findings elegantly through both writing and public speaking to earn the broad acceptance of the academic community. I firmly believe that the fundamental qualities cultivated by this training will serve as a lifelong asset, universally applicable in any field. None of this profound personal and professional growth would have been possible without his unreserved cultivation.

I must also express my special appreciation to my senior labmate and roommate, Dr. Nan Wu, with whom I share a deep, battle-tested friendship. My very first impression of the United States was entirely shaped by him when he picked me up at Washington Dulles Airport (IAD) holding a gigantic, 30-ounce (nearly 1-liter) pink Starbucks drink in a bizarrely bright color, perfectly embodying the classic American culture of oversized, weirdly-colored beverages, before taking me to an equally classic, and terribly unappetizing, American breakfast at IHOP. Thanks to his care, I barely needed to adapt to my new life or even buy much upon arrival. Over the past few years, we worked together from our

shared basement. I know living in a basement sounds awful, but it was actually spacious and had absolutely everything we needed, and thus we moved all our lab equipment there. We stayed up late together to meet endless deadlines, treating each other's lead-authored papers as our own by running experiments and revising drafts side by side. Out of that single basement, we collectively published dozens of papers.

I am also incredibly grateful to my collaborator, Dr. Songqing Chen. Even as a senior professor and department chair, he generously dedicated an immense amount of time to me, treating me like his own student from the very beginning. I still clearly remember my first Christmas in the United States, which I spent online with him and my advisor discussing research ideas. In my early days as a junior researcher, when I was still struggling to grasp how to write a good paper, he patiently sat down with my advisor to meticulously revise my drafts word by word. Through his exceptional guidance, we ultimately published over a dozen papers together.

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Finally, beneath all the invaluable support I received, this journey ultimately required my own resilience. Balancing an extraordinarily demanding work schedule with the sheer exhaustion of a PhD constantly tested my limits. I am deeply grateful to the version of myself who simply refused to give up and pushed through countless late nights. Today, I am proud of the phenomenal publication record I have achieved and the dedicated researcher I have become.