私の自慢

Things I am proud of

Guangbin DONG

Department of Chemistry, University of Chicago, Chicago, Illinois 60637, United States

I feel quite lucky to be selected for the 2024 Mitsui Chemicals Catalysis Science Award. It is such a tremendous honor to receive this recognition, because literally all the previous awardees are role models of mine in this field. In addition to the generous sponsorship of Mitsui Chemicals, there are many people and universities I am deeply grateful to. Herein I appreciate the invitation of Mr. Toshiyuki Nakaya from the Chemical Society of Japan to write a column at *Chemistry and Chemical Industry* and would like to use this opportunity to acknowledge these people and universities.

In 1999, I was admitted to Peking University for undergraduate study. I feel very proud to attend Peking University, because it is one of the very best Universities and one of the most competitive universities to be admitted in China. I was assigned to the chemistry major, which let me begin the journal of chemistry study. The professors and lecturers at the College of Chemistry and Molecular Engineering in Peking University were extremely wonderful. They made me immediately fall in love with chemistry. Especially, I was fascinated by the subject of organic chemistry, an area of science that requires three-dimensional imagination, which I found was fun to study. At Peking University, I met one of the most important mentors in my life, Prof. Zhen Yang. I felt lucky to be able to conduct undergraduate research in his lab, where I started to learn the beauty of organic synthesis and palladium catalysis. At that time, Prof. Yang just came back to China from the United States of America where he received first-class of training in total synthesis and medicinal chemistry. All the research projects in his lab were very interesting, including natural product total synthesis and methodology development. I mainly participated in the project of developing thiourea ligands for transition metal catalysis. In this process, I learned fundamentals of organometallic chemistry and catalysis. I participated in the development of several Pd-thiourea catalyzed reactions with other lab members. Later, I started my independent study of the mechanism involving thiourea ligands and discovered the first Pd-catalyzed Paulson-Khand reaction, which was enabled by the thiourea ligand, and the Co/thiourea-catalyzed Paulson-Khand reaction before I left Prof. Yang's lab. During this process, Prof. Yang provided generous support, which I was very much grateful for. He also showed enormous passion in organic chemistry. Undoubtedly, Prof. Yang became a role model of mine, which motivated to study organic chemistry in more depth in the United States.

I started graduate school in 2004 at Stanford University and pursued a Ph.D. degree under the supervision of Prof. Barry M. Trost. This is another experience I was very proud of. Although Prof. Trost travelled a lot during that period of time, his mentoring and teaching never lacked behind, which have made lifetime impacts to my career. I am always impressed by how sharp and how knowledgeable Prof. Trost is when talking to him. The conversation was always inspiring. His intensive love to organic chemistry infected me a lot. In the group meetings, he always tried to guide the students to get the answers to a question he asked. The MOM（molecule of the month）meetings in his lab were always fun memories, which I have adopted for my own research group. Prof. Trost is so creative, and when our research encountered some challenges, he always provided numerous ideas for us to try. Stanford University is also a wonderful place to spend five years for graduate school, where I met several world-leading professors who have made great positive influence on me and a number of lifetime good friends. For the graduate research, I was mainly focused on total synthesis of natural products using transition metal catalysis. I was able to complete the total syntheses of agelastatin A（twice）through developing new Pd-catalyzed asymmetric allylic alkylation reactions, terpestacin, and bryostatins, and have developed an asymmetric propargylation method.

Impressed by the power of transition metal catalysis, I then hoped to learn more about organometallic chemistry and catalysis, and luckily found a postdoc position in late Prof. Bob Grubbs' lab at Caltech in 2009. Bob was a unique person, and even if he was

so famous and had made so many great achievements, he was so modest and down to the earth. He taught me a lot about how to be a good mentor and how to be a good person. The most common thing he asked me when I was in lab was "are you having fun with chemistry"? When he started to talk about chemistry, he then behaves like a child full of curiosity and excitement. I feel very proud of being one of Bob's trainees. Bob was very generous of supporting his students and postdocs. When I was applying for faculty positions, although I had not got good results yet for the project I was working on, Bob still provided strong recommendation letters to support my application. Caltech was also such a peaceful and focused place to conduct research. Your mind can become very focused in this place. In Bob's lab, my research was to develop anti-Markovnikov hydration of alkenes, also known as one of the top 10 challenges in catalysis. While I was not able to fully address this problem, I came up an alternative formal anti-Markovnikov hydration through a triple relay catalysis, which was published in *Science*.

I started my independent career as an assistant professor at the University of Texas at Austin（UT Austin）in 2011. For that period, I am most grateful to and proud of the first few generations of graduate students and postdocs I mentored in Texas. It is them who set up the foundation of my whole research program. For example, Dr. Tao Xu, one of my first postdocs, developed our group's first paper on "cut-and-sew" chemistry. Zhi Ren and Dr. Fanyang Mo established the concept of *exo*-directing group. Zhongxing Huang started the direction of carbonyl desaturation and functionalization. Zhe Dong enabled the revival of the palladium/norbornene cooperative catalysis. Dr. Fanyang Mo began our group's journey on ketone alkylation using simple alkenes.....so on and so forth. There is no room to list all their names and their contributions. In short, all the group members' hard efforts laid the foundation of our group culture and research programs. On the other hand, I am also very grateful to my colleagues at UT Austin. They allowed my smooth transition from the role of a postdoc to a professor, and I learned so much from them about how to teach, how to write papers, and how to write grants. I deeply appreciate the friendship and mentorship from them. Certainly, I feel very proud of being a colleague of them— being a "longhorn" in my life. Especially, I would like to acknowledge Prof. Steve Martin, who was my faculty mentor. Steve has taught me so much about how to succeed in academia, and like my other mentors, Steve has been offering generous support through my whole career!

Since 2016, I started a new stage of career at the University of Chicago, where I hold my current position. This again has been a fruitful and joyful journey. I started two new research directions at Chicago. The first one is the synthesis of graphene nanoribbons（GNRs）, where I am proud of my group for discovering the first use of *ortho*-terphenylenes as effective building blocks to construct armchair GNRs, as well as the development of iterative approaches to precisely control the sequence. The second new direction is boron chemistry, which includes insertion of boron into carbon-heteroatom bond and new types of boron homologation reactions. In addition, more exciting breakthroughs have been made in the area of C-C bond activation and palladium/norbornene catalysis. This includes the activation of unstrained ketones, aromatization-driven C-C bond cleavage, the palladium/norbornene-catalyzed carbonyl 1,2-transposition, and a hook-and-slide strategy for amide homologation. Besides, I am also very grateful to the generous support of my colleagues. Especially, Prof. Viresh Rawal has been such a kind and generous friend, who has nominated me numerous times for different awards, including this Mitsui Catalysis Award, and offered so many great suggestions and advice! I deeply appreciate everything and feel so proud to be his colleague and friend. Finally, the University of Chicago provides a wonderful environment and faculty support for conducting research. I feel honored to be a faculty at this esteemed institution.

To conclude, I feel so grateful to all these people who I have got the chance to work with. Nothing would be possible without them and their supports. I feel so proud of knowing and having spent time with these great people, who have greatly influenced my career. I also feel so proud of having spent some time at these great universities. They provided the soil and nutrition for me to grow, and more importantly they allowed me to get to know these great mentors, friends, and coworkers!

Prof. Guangbin DONG is currently a guest editor for the web issue "*Organometallic Chemistry for Organic Synthesis*" of the CSJ Journals, which includes the Diamond Collection in the Bulletin of the Chemical Society of Japan and the Focus Collection in Chemistry Letters.