First, I would like to express my grateful acknowledgment to my promotor, Prof. Patrick R. Onck for your mentoring and guiding. The research target could have not been reached without your supervision and full support. Regular weekly meetings helped me to iterate and polish my research results and frequent discussions inspired me so that new ideas kept coming up during the brainstorm. Under your supervision, I was guided to tackle interdisciplinary topics and decompose complex problems to solvable sub-problems with sufficient physical understanding. My writing and presenting skills have been improved a lot with the help from you, via meticulous revisions of my every manuscripts and critical comments on my presentations, as well as numerous constructive suggestions after my presentations. Travelling with you in the way of attending meetings is also a fun. Not just I am approved to travel with 1st class train seat, but also face-to-face discussions on a train, which is quite different compared to sitting in an office room, provides different atmosphere for interchanging our thoughts. Additionally, I appreciate plentiful career and life advices from you. Wish you success and achievement in your following research, and a happy life for your family.

Second, I would like to gratefully thank my experimental collaborators from Eindhoven University of Technology: Prof. Dirk J. Broer, Prof. Jaap den Toonder, dr. Danqing Liu and Matthew Hendrikz. It is a very inspiring and exciting adventure to work with visionaries like you, and I witness the journey you achieved big, grand goals from such small micron-range polymer specimens. What you provided to me is not just experimental data I needed for my computational model, but also a well-developed platform which has diverse application potentials and an excellent research topic I am really intrigued with. Every progress meeting with you was a chance for me to get impressed and enchanted by fruitful results from the experiment side and I was always encouraged to use my expertise to polish the story behind the results. At the same time, acknowledge to the researchers involved in my DPI project, Prof. Cees Bastiaansen, dr. Theo Hoeks, dr. Kees Hendriks, dr. John van Haare, dr. Nadia Grossiord and Prof. Frans de Schryver. It is a great pleasure to work with experts
like you and wish you all have more achievements in your following academic career.

As an intermission, I would like to thank the three professors of the reading committee of my thesis, Prof. Albert P.H.J. Schenning (TU/e), Prof. Mark Warner (Cambridge) and Prof. Katja Loos (RUG) for your constructive reading.

Third, I would like to thank our group members. Prof. Erik van der Giessen gave lots of useful suggestions during my MuMech-group talks and all the way along my research journey. Your profound understanding in mechanics and physics taught me how to utilize basic physical rules to elucidate complex problems in science and also in daily lives. Edwin de Jong (also the photographer of MuMech), it is glad to share an office (the famous room 0128) with you and conduct a joint project together. Many thanks to other group members, Sander Boonstra, Arjan Boerma, Ankur Mishra, R.P. Singh and Tarun Katiyar for your help and your time spent in our group outings or group dinners (“Nerd” Dinner, Christmas dinner), and also thanks some new-comers and previous members, Fangfang Guo, Rongjing Zhang, Jianqiao Hu, Henry de Vries, Siva S. R. Saane, Samdeep Namdeo and Ali Ghavami. Thanks to four bachelor project students whom I had privilege to work with, Maxens van Daalen, Frits Kermkamp, Alexandre Martins Oliveira Cabrita and Jip van Ham. Also thanks to group secretaries, A.J. Sibmaa (Ria) and Andrea Dijkema, and group technician Jaap Aikema for lots of help. Special thanks to Hengxu Song, who is also my classmate back in my bachelor study, for introducing me to this group and your plentiful help on my research. Special thanks to Edwin De Jong and Rongjing Zhang for being my parnymphs. I am very glad to meet all of you here in Groningen and wish you all have fruitful output in your research or further career.

I would like to express special thanks to my master degree supervisor, Prof. Zheng-ming Huang. Thanks for all your long-time support in my academic journey. As a instructor and a guider, you plays a significant role in my science adventure.

Four, I would like to thank lots of local friends. My weekend life was entertained by parties, board games and delicious food. Thanks Peiliang Zhao, Lijuan Xing, Bin Chen, Jun Li, Pu Yang, Weiteng Guo, Xukai Zhang, Yucheng Wei, Jiacong Wei, Nian Chen, Lanlan Yang, Yang Chen, Zhiheng Sun, Wenqing Zhang and other friends in our Chinese community for the time you spent with me. As a sport man, I was active in soccer, basketball and badminton games in Groningen. Glad to play with lots of friends here, Haojie Cao, Boqun Liu, Xiaoming Miao, Gang Huang, Kai Liu, Tao Zhang, Yanxi Zhang, Jiquan Wu, Qingkai Yang, Zhuohua Sun and other footballers; Qi Liu, Lei Lv, Hang He, Yanglei Yi, Muxingye Chen, Yuanze Wang, Qihui Zhou and other basketballers. Wish you all well and hope to see you in the future.

I would like to express my grateful thanks to Zhiwei Zhou, for your heart-warming, everlasting love and accompanying. My life in Groningen would be much lonely and monotonous without you. You enriched my life and, more importantly, encouraged and supported me, as my great spiritual friend.

感謝一路出现在我生命中的朋友们。感谢我的父亲、母亲、哥嫂一家以及各位亲人。谢谢你们对我一直以来的爱、鼓励和支持。愿你们身体健康，家庭幸福，一切安好。

Ling Liu (刘凌)
winter-2017, at Groningen