

School of Physical and Mathematical Sciences









SCHOOL OF PHYSICAL & MATHEMATICAL SCIENCES NANYANG TECHNOLOGICAL UNIVERSITY

SPMS-04-01, 21 NANYANG LINK SINGAPORE 637371

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Vision

Our vision, and our tasks, is to build a renowned school with strong faculty, innovative curricula, promising students, strong links with industry and supportive alumni.

Mission

Our mission is twofold:

- 1. In teaching, to impart the habit and mode of thinking in science and mathematics using the most effective pedagogical methods;
- 2. In research to contribute to the scholarship of discovery, integration, application and teaching.



Message The Chair From



My heartiest congratulations to the SPMS graduating class of 2013!

This is a moment to celebrate the perseverance, courage, ambition, and intelligence that got you here. I am proud of the accomplishments of all of you. But I think you will agree with me that the greatest lesson of all during your university life at NTU is the learning of yourself; your strengths, your weaknesses, your dreams, your fears, your relationships, your independence. You will benefit from remembering this lesson.

Finally, I want to thank you for choosing SPMS. With that choice, you have also transformed us into something better.

I wish you all the best in your endeavours, and good luck.

Chee Yeow Meng Chair of SPMS

Message From

The Head of Division



Congratulations, Class of 2013! I hope your undergraduate years in CBC were a well-spent and meaningful period of your life and I'm sure you will leave CBC with many fond memories of your time in the lecture rooms and research laboratories.

Graduation is one of the major milestones in your life and the best is yet to be!

Chiba Shunsuke Head, CBC

Message From

The Head of Division



Dear Class of 2013,

Congratulations on your graduation! You have accomplished an important achievement.

I wish you a successful career ahead and hope that the learning experience that you have gained from SPMS will be helpful in your life.

Please keep in touch. You are always welcome back.

Phan Anh Tuan Head, PAP

Message From

The Head of Division



Dear Graduates.

Congratulations on your graduation! Congratulations on your academic achievement!

The twenty-first century has brought great opportunities for the Mathematical Sciences. Many areas of science, engineering, medicine, business, national defense and social sciences rely on ideas, techniques and skills from the mathematical sciences, such as modeling and analyzing complex systems, computer simulations and analysis of massive amounts of data etc. They are also playing a more and more important role in our daily life, from internet search, online banking, computer animation, weather forecasting, medical imaging to optimization in business and military, stock control, and analyses of financial risks. I hope your training in Mathematical Sciences or Mathematics & Economics has equipped you

with a range of skills and led you to a wide range of careers. I'm confident that you will make great success with all these opportunities.

I thank your parents, friends, faculty and staff who have helped you to make this achievement!

I believe that this four year journey at NTU is a unique and important experience in your life, and that you would be proud of becoming a NTU/SPMS/MAS alumni! At the end I must say that all the faculty and staff at MAS wish you well in your future careers and hope you always draw from the experiences you learnt while you were studying at NTU.

Wang Huaxiong Head of MAS

Message From

The Faculty

Message From

The Student Leader



Congratulations, SPMS Class of 2013. My best wishes to you as you successfully close one chapter in your lives and embark on a new one.

Ling San



Bravo to the exciting research adventures that we have together! They are moments that I will always cherish.

Chew Lock Yue



Yes, you can...change the world for the better. Follow or develop your passion, create your network, and act on it.

Lee Soo Ying



Greetings,

It is such an extraordinary experience to have you as part of the SPMS big family. Looking back upon the past 4 years, it takes strength and courage to complete your bachelor degree with hardwork and persistence. Apart from your hard earned academic results, I believe you have made many friends and life skills that will aid you in achieving success and joy in life.

I offered my heartiest well wishes to all of you in that I trust this marks another milestone in your life and you are ready to conquer all the possible challenges in life with confident.

Congratulations

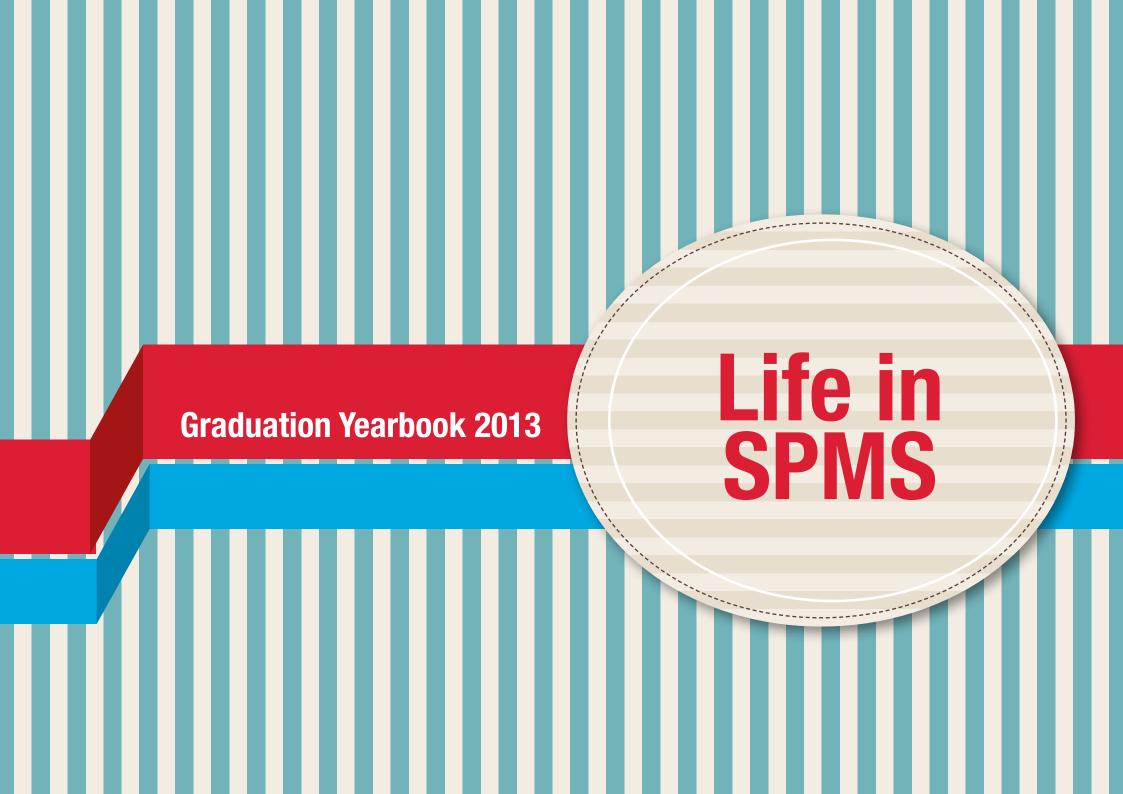
Calvin Natanael
President
8th Management Committee
School of Physical and Mathematical Sciences Club



Con-GRAD-ulations, Class of 2013! You have completed a very important chapter of your life. Graduation is not the end; instead it's the beginning of another new and exciting chapter. Your schooling may be over, but always remember that education is a lifelong thing and it still goes on.

Wherever you are going after graduation, go confidently in the direction of your dreams with all your heart. The future is in your hands. Think big and dream big! The world that awaits you is endless, so go for the life you have imagined!"

Li Meng Ling President of the SPMS Graduate Club











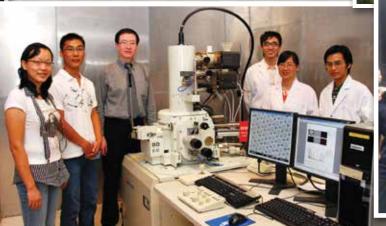






























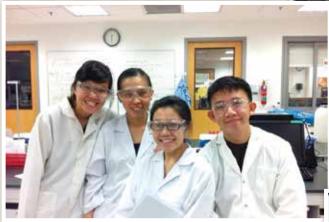
NTU SPMS Graduation Yearbook 2013







Division of Mathematical Sciences









































































































































































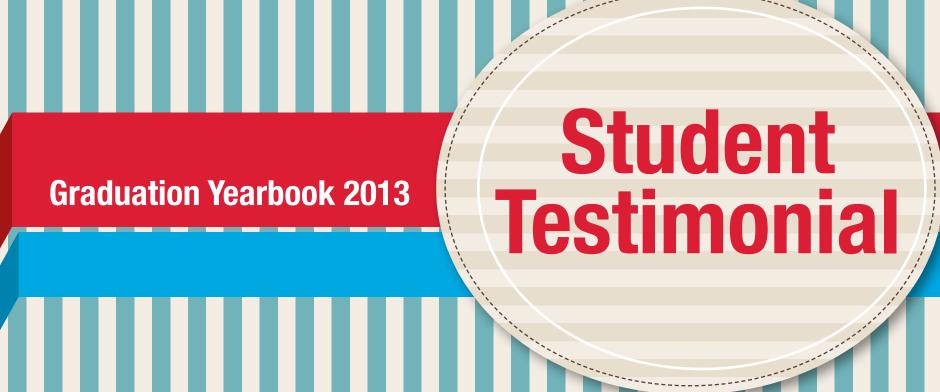














I would like to express my gratitude to all my professors, friends and classmates who supported and encouraged me along the way. I was very thankful to have Prof Chen Ning as my URECA supervisor for two years and Prof Xiang Liming as my FYP supervisor. I have learnt from them what research is and how to conduct a research. Thank you very much!

A fulfilling and memorable experience in SPMS!

Yang Endong, MATH



Thank you Prof Shao Fangwei for your kind support and opportunities you gave me for summer research and mini FYP. I will always admire your determination and interesting problem-solving methods. Wishing you all the best for your future research projects!

Thank you SPMS for contributing a dominant part in my university life. My group studies, laboratory works, presentations and exam preparation are mostly done within or in the vicinity of SPMS. I will always cherish you with all

my SPMS friends: Adhitya, Marchelina, Kezia, Maria, Agus, Bening, Meigi - I love you guys all!

Elbert Wijaya, CHEM



I am proud of myself for choosing SPMS MAEC as my university major 4 years ago. During my student life, the knowledge, skills, friendship, joy and laughter that I have gained provided me with wonderful lifetime memories. Great thanks to all professors who have guided me, all staff who have helped and all friends who have supported me. Great thanks to SPMS. You will have a more brilliant future, with us being your alumni!

Zhang Jianhuan, MAEC



I would like to extend my sincere gratitude and appreciation to Prof Xiang Liming, for her support on my final year project. The project would not be possible without her patient guidance and valuable feedback. Thank you very much. I am also grateful to the professors in school who have imparted their knowledge and provided assistance to me in my course of study. I thank them for their efforts in teaching and making my learning experience in SPMS a fruitful and memorable one.

Goh Ching Liang, MAS



I would like to thank Dr Tan Geok Choo, Dr Fedor Duzhin and Prof Chan Song Heng for helping me to lay the foundations in Mathematics during my first semester. Undergraduate Mathematics is a whole new different ball game, and it was challenging initially to adapt to proving results instead of doing algorithmic calculations. My instructors were very willing to help me in the transition and made time for me to consult them. I am greatly indebted to them for allowing me to appreciate Mathematics at a deeper level and to see its beauty.

Huang Zhenhui, MAEC



Throughout my 4 years in CBC, Prof Ling Xing Yi is definitely the most caring and responsible professor in the school. She spends time and effort to discuss projects with the students under her wing weekly, guiding and pushing them in the right direction whenever needed. She also takes the initiative to talk to students and show appreciation to the student helpers whenever she meets them in the hallway. Her words of encouragement to students are heartfelt and earnest, and she is always willing to help any student in need. She epitomises what a professor should be like and I would strongly recommend students to work with her.

Ong Jiacheng Matthew, CHEM



For my FYP professor, Prof Martin Pumera, he has helped me in so many ways. I cannot keep track. When I first went to find him for a FYP spot in his laboratory, his friendliness caught me by surprise. I was only a newbie in the Analytical Chemistry field but he willingly and patiently explained his research areas to me. When I made mistakes inside and outside the lab, he was patient and firm with me, without being fierce or overwhelming. The earnest way with which he treats his students earned my respect. I am very thankful to him for teaching me and pushing me beyond my own perceived boundaries.

Prof Chiba Shunsuke, my first research professor, always exudes a friendly and approachable exterior. He truly believes in helping every student in any way that he can. When I was his student, he often asked for my progress in any way that he can. When I was his student, he often asked for my progress to ensure that I was in the right direction and on schedule. His concern for students is genuine and I really appreciate it.

Throughout my 4 years in NTU, I have been blessed with many friends who brought so much laughter and joy to my life. Though there were times when things did not seem as rosy as I would like them to be, these enabled me to appreciate my blessings even more. Right from the beginning when I joined the SPMS FOC'09, I was immediately immersed in an environment where I felt that I was part of a family. I paid it forward, and joined the subsequent two FOCs as a group leader, hoping to influence and help my juniors the way my seniors did for me. In my opinion, my school mates were the ones who enriched and improved my school life, instead of the other way round.

With the encouragement of my senior, I committed myself to SPMS YEP'11. That was one of the best experiences I have ever had. The bonding with my teammates borne of hardships and a common goal, and the hard work and effort put into planning the trip are invaluable experiences that would stay with me my whole life. SPMS YEP'11 has somewhat changed the way I think and act, and has given me much more than I initially expected.

I was very fortunate to be able to go on INSTEP at the University of Manchester. The fact that I was away from my family in a foreign land had made me very apprehensive initially. However, the close-knit friendships fostered with the other Singaporeans provided me with comfort and reassurance. All the travelling I did broadened my horizons and put my limits to the test. This exchange experience has helped to shape me into a better person, enabling me to stretch myself further and learn lessons that I can never experience without stepping out of Singapore.

Of course, I would never be able to endure the mundane school life without my clique of friends, who accepted me for who I am. We would reserve LT seats for the late ones, stay late in school to study together, have after-exams barbeques or some random outings together. We were there for one another when things get tough and when in times of need. They are the joy I find in school amongst the tedious schoolwork and hectic schedules.

Tan Shu Min , CHEM



I love NTU. I love SPMS. I love Statistics.

Prof Pan Guangming and Prof Chen Ning provided good explanation for lectures and did enough preparation for each course.

Zhu Liye, MATH



I enjoyed my 4 years in SPMS. A big thank you to all professors who had taught me. In particular, I would like to thank Dr Gao Peng for his patience and help, and Prof Ernie Teo for his guidance. Thank you NTU and SPMS for this wonderful university experience!:)

Ong Fengyi, MAEC



Prof Andrew James Kricker is my favourite professor in SPMS!! He is presenting instead of reading slides in lecture and his tutorial is always inspiring!

Zhang Shaoyu, MAEC



SPMS had provided us a wonderful study environment & university life, thanksss:)

Toh Siew Qi. MAEC



I would like express my utmost gratitude to Prof Chen Hongyu for giving me the opportunity to research in his lab when I was in year 3 and 4. He has taught me to explore issues from various perspectives and think critically when facing scientific problems. This has become very useful for me as I embark on a scientific career. Also, he is one of the most approachable teachers I have met. I wish him and the lab well. Thank you very much, Prof!

Vibrant campus life and the wide range of facilities have added brilliant colours to my stay in SPMS. The friendships forged during my stay are most memorable. Special thanks to Audrey, Nicole and Yong Siang!

Mah Chin Hao, CHEM



I would like to thank all the professors who had taught and guided me for the past 4 years in SPMS. Special thanks to Prof Lian Heng, Prof Pan Guangming and Prof Pang Zhen who had taught me for several statistics modules. Thank you for your patience and guidance.

Throughout these 4 years, memorable experiences, valuable skills and knowledge are what I had gained from SPMS. During the 2012 summer holidays, I was attached to Nan Chiau High School for my Internship Programme. Through the Internship Programme, I had

experienced teaching as a career. This is a good chance for me to consider if teaching is a suitable career path for me after graduated. Other than being able to excel academically in SPMS, there were also non-academic events and competitions held by SPMS. As I always have a strong passion for running, I took part in the College of Science Run in 2012 and emerged 2nd position for Women's Individual Category.

Ong Li Jing, MATH



The best part about having a 4 year course is that you get to spread out your courses and get to experience a bit of the overseas student life. From Australia to Shanghai, from bungee jumping to sky diving, from interning at a bank to studying stingrays at the beach, SPMS gives you the opportunity to develop yourself more than you think you have inside you.

A big thank you to all the teachers who have taught me throughout these 4 years. They have shaped me for who I am today. Thank you ©

Heng Li Sheng, MATH



The best thing I love SPMS is that there were plenty of chances to consult and discuss with professors and lecturers, such as Prof Nicolas Privault, Prof Wang Desheng, Prof Chua Chek Beng and Prof Pan Guangming, etc. They are friendly and willing to help us patiently. Those discussions and consultations gave me wonderful and meaningful memories during my 4 years with SPMS.

Zhang Qi, MATH



I was moved and impressed by the depth of the questions Prof Edwin Yeow puts to his students. His questions always challenge my thinking and encouraged me to think deeply and analytically about the knowledge and concepts behind those scenarios and to think in new ways. That really sparked my imagination! The way he talks to his students is inspiring and they seem mesmerized. He always encourages his students to learn, explore, and push their boundaries further. This course (CBC 426) exceeded my expectations! I dare say, throughout the course I was able to reap the maximum benefit from it. Thanks, Prof Edwin Yeow! Thank you for your diligence, patience, wisdom and encouragement to all the kids in our community.

Sam Sue Wan, CHEM



It has been a fulfilling journey of 4 years in SPMS that I will cherish forever. Thank you everyone who has contributed inches or pieces. Good luck to everyone who will embark in a long journey of adult life!

I only knew Prof Lee Soo Ying for a few months ago. He is my NTU tutor for internship. Thank you Prof for reminding me to keep trying and learning. Thank you Prof for being so caring.

Marchelina Vincensia, CHEM



Being part of SPMS-ians is great! Student in, scientist out!

Thanks to Prof Cheong Siew Ann for his excellent ideology in research which opened my mind about what research is!

Thanks to Prof Shen Zexiang for giving me the opportunity to work in his research group to gain my research experience as a Physics student!

Saw Giek Zhen, PHY



Being enrolled in NTU SPMS is indeed a blessing for me. I got many friends, networks, experiences and lessons which are beneficial in the future. I am thankful for the opportunity to serve in SPMS Club as a CBC Representative; it has taught me more about managing time and being responsible. Courses from a variety of topics as well as my electives and minors have been really useful too. Furthermore, the internship and part time job opportunities prepared me for a career. I believe these are factors that landed me in job offers 10 months prior to graduation. Thank you SPMS and NTU for preparing me:)

Kezia Gusmawan, CHEM



My life in SPMS is very happy. Firstly, the professors here are very kind and patient — they are always willing to answer questions from the students. Professors are also patient enough to explain the problem until the students fully understands. I remember that during my course CBC 315, the teaching assistants always answered my questions with patience and thus helped me a lot in my course. Secondly, the students here are also very friendly, and it is very easy to communicate with them. Although I am not good with speaking English, they will try their best to talk to me and understand what I mean. Like the team work in the course HW0303, the other teammates helped me

to improve my presentation slides. Last but not least, the university has a number of different clubs and the clubs hold all kinds of events. I enjoy playing chess in the chess club and the board games in the board game club.

Prof Chen Hongyu knew every single detail about the courses he taught. His lecture was very interesting and he managed to explain the difficult concepts with easy examples. Prof Tan Howe Siang managed to explain the tough concepts with interesting examples. His notes on calculus showed that he spent a lot of time on the course preparation.

Luo Yixing, CHEM



I had a wonderful time in SPMS. We benefited a lot and made friends with the excellent and approachable professors here. Without them, we would not be equipped with the ability of studying and exploring more interesting research topics. The study life here is not as boring as many people imagine because of the variety of activities available here. I also appreciate the precious opportunity to conduct tutorials during my last 2 years. I made many friends with my juniors and most importantly, I understand that "it's more difficult to be understood than to understand". At this memorable moment, I want to express my sincere thanks and best wishes to you, SPMS!

Prof Sinai Robins: Thank you very much for your kind help and care during the past 2 years. It is my honor and luck to be your student and I learnt a lot from you. I really admire your carefulness and earnest passion in research. I know I still have a long way to go in this area, but I will try my best! Wish you all the best and I hope I can continue to study and research under your supervision.

Zhang Yichi, MATH



It was definitely a fruitful experience and I had an enjoyable time studying in NTU SPMS (MAS). It is the place where I got to meet many good friends who are always there to cheer me on, and approachable professors and tutors who are always there to help and guide me along whenever I am in doubt. I also had the chance to go for an overseas exchange, which turned out to be one of the best times in my university life. I would like to take this opportunity to thank everyone who had helped me in one way or another during my undergraduate studies. To all the

MAS professors who had taught me previously and all the course mates whom I have crossed path with, thank you very much! \odot

Lau Pei Ting, MATH



I enjoy my 4 years in CBC a lot! Though there were tough days but with the encouragements from the good friends that I have known in CBC, we managed to endure and finally graduated from CBC! All the best in the next phase of life after graduation :)

Eileen Ng Yi Ling, CHEM



SPMS has been an enjoyable place for me because I have made wonderful friends around me and it is where I have grown up to become someone of greater maturity. I have learnt a lot, especially time management, and have had all sorts of tutoring from my friends here. The professors are amicable and approachable and have given me proper guidance and consultations during my years spent in SPMS. It is a place full of fond memories for me and I really cherish my time spent during all these years of my university life.

Siah Li Hin. CHEM



Four years in SPMS passed by in the blink of an eye. I believe many of us will probably still feel surreal about our times spent in SPMS, even though our last papers had only ended one month ago. The four years spent were fruitful and I have grown to learn much from my experiences in the university. The flexible timetable of the division had allowed me to participate in extra-curriculum activities, mainly as an active member of the Symphonic Band and a leader for the Ministerial Forums.

Research opportunities are also available from the Freshman year. I was given an opportunity to do my final year project under Prof Chiba Shunsuke, who has taught me that even though producing results is important, the learning process of attaining them is much more crucial to develop a critical mind and good laboratory skills. Even though I experienced failures and obstacles in the course

of the research, I believe that they helped carve a stronger, more patient and independent researcher in me. Taking this opportunity, I would like to express my sincere gratitude to Prof Chiba, as well as to the entire Chiba group.

Lastly, I would like to thank all my friends who have played such important roles to liven up my life in the university. This is especially extended to THE UNIGANG - friends who never fail to make mundane lessons and studying session fun and for the encouragement and support given for the past 4 years.

To all graduates: All the best in our future endeavors!

Chua Neng, CHEM



I feel really lucky to find a group of friends who share the same interest and dreams with me.

I want to thank Prof. Cheong Siew Ann for his great help in

my research and study.

Wang Yidan, PHY



SPMS was one of the most memorable journeys in my educational journey. Not only did it groom me into an all rounded person, I also picked up numerous life skills from friends and professors here. SPMS, you will be missed!

Liu Fu Quan, CHEM



I enjoyed the time studying in SPMS. I made a lot of friends and they enriched my life experience and made my life colorful.

Lin Feifei, MAEC



Life in SPMS is challenging yet fruitful, stressful yet memorable, busy vet FUN!

Yondy Thong, MATH



SPMS has given me the opportunity to excel, provided me with a nurturing environment and allowed me to cultivate everlasting friendships. Last but not least, SPMS has given me an unforgettable 3.5 years worth of memories that I will always cherish.

Au Wanting, MATH



SPMS got us together; there are so much sweet and bitter memories that cannot be erased while looking back to the past 4 years. Although our paths are very different in the future, we are still thankful for the fate that got us together in NTU SPMS MAEC. Babes, let's chiong for life and dreams without regret! Jiavous to you all and happy graduating! <3

Low Chai Wee, MAEC



SPMS is always a place for study. There are always places for us to study. Teachers are always there for us to clear our doubts. Computer labs are available for us to learn, relax and explore. SPMS is a great place for learning, fun and relaxation.

im Yan Ting, MATH



Congratulations everyone's graduation! Wishing you a future filled with success and joy of seeing your dreams come true.

i Weifena, PAP



The most comfortable campus life.

Chen Jie. MAS



Studying at SPMS has been a great experience for me. The SPMS Chemistry graduate program allowed me to discover who I was and who I wanted to be in both my personal and professional life. I am very fortunate to have had the opportunity to gain a superb education while making lifelong friendships at SPMS.

I offer my sincerest gratitude to Prof Richard D. Webster who is not only my supervisor but dear friend. He has supported me all these 4 years with his patience, motivation, enthusiasm, and immense knowledge whilst allowing me the room to work in my own way. He has been everything that one could have wanted in an advisor and a friend.

Bahareh Khezri, CBC



Prof Lee Soo-Ying is one of the few people who can inspire others with his vision and ideas. He set an extraordinary standard for me with his rigorous scholarship, broadmindedness, and positive attitude towards life. I would like to give my sincerest appreciation to him.

Song Hongwei, CBC



I was enrolled into NTU as a CBC PhD candidate in 2009. At that time, the CBC building was new and I still remember the official opening in July 2009, which attracted many world-class scientists from all over the world. The cutting edge facilities such as the central instrumental supplies, the advanced laboratories and the safety procedures provided us with a conducive environment to conduct research work. Besides the hardware, the graduate program also impressed me deeply. The "Graduate Seminar" course offers us a good opportunity to learn about excellent research worldwide. The compulsory modules such as "Organometallic Chemistry", "Organic Chemistry" enhanced our background knowledge. The "Scientific English" course gives international students a good chance to learn the formal English used in science. The

"Teaching Assistant" duty tremendously built up our capability of supervision which is beneficial to our whole career development. The SPMS graduate club also arranges many dynamic activities to enrich our leisure time.

In summary, I spent 4 years of unforgettable and rewarding study time in CBC. It will definitely become the treasure in my life.

Prof So Cheuk-Wai is my supervisor during the past 4 years. I was really impressed by his attitude and spirit to research. Before every public presentation, he will give us strict advice and comments on our performance. He also trained us to work independently and every lab member had an individual research project and experimental instrument. At the beginning of my PhD study, I always got lost due to the repeated frustrations of the experiments and Dr. So told me at that time, "PhD is like a training which will you make you tough, make you know how to face the difficulty and go through it." I will remember the saying forever. I appreciate Dr. So's supervision not only for my scientific work but more importantly, for the spirit of research.

Guo Jiayi, CBC



For my time as a graduate student in SPMS, I would like to thank my advisor, Prof Chew Lock Yue, who has been my longtime friend since I first came to Singapore in August 2005. I am very grateful for his precious teaching, patient guidance and great support in many different issues throughout my PhD. I also benefitted much from his invaluable advices which are very useful and important to me in developing my career at the very initial stage.

I would also like to thank another long-time friend, Prof Koh Tieh Yong, at the Division of Physics and

Applied Physics. I always appreciate and enjoy much fruitful and critical discussions with him for he always criticised me for not being mathematically rigorous and being sceptical about whatever I say.

Huynh Hoai Nguyen, PAP

Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young.

- Henry Ford

