

26-1 學校簡介

KTH 是世界百大之一，工程學院更是世界排名前 50 名，校區坐落於瑞典首都斯德哥爾摩，校園廣大，部分校舍已有百年歷史，是一所歷史悠久的大學。許多知名企業與學校的研究單位有合作，學生可能在做研究的同時即被企業錄用。

26-2 國外研修之課程學習（課內）

我在 KTH 交換期間修習了 4 門碩士班課程，分別為 Internal Combustion Engine，Vehicle System Technology，Vehicle Components 及 Hybrid Vehicle Drive。瑞典的學期制跟台灣不一樣，他們除了上下學期，每學期還各分成 2 個 period，也就是一年有 4 個 period 的意思，大部分學生每個 period 只選兩門課，我覺得這樣比台灣的方式好很多，因為不會同時有太多科目需要照顧，學習也可以更深入也更有效。

第一個 period 我選了 Internal Combustion Engine 及 Vehicle System Technology。Internal Combustion Engine，內燃機，也就是常說的引擎，因為我對車輛相當有興趣，但中山車輛相關的課程很少，甚至可以說是根本沒有，因此這門課對我來說非常有趣，課程內容不是只教理論，還包括分組作業，引擎拆裝實驗，參觀知名瑞典卡車品牌 Scania 的工廠，對我來說是相當新奇的體驗。

再來是 Vehicle System Technology，看課程介紹我以為是汽車相關，結果百分之八十都是關於鐵路系統，我有點失望，不過分組報告時與來自不同國家的同學一起討論對我來說是一個突破，因為大學時因為科系的關係幾乎沒有分組報告，我的報告經驗已經很少更何況是還必須用英文討論。

The next period I attended 2 courses, Vehicle Components and Hybrid vehicle drive. Vehicle Components mainly focused on the transmission and suspension system in heavy or passenger vehicles. Same as the Internal Combustion Engine course I took in the last period, VC had not only theoretical knowledge, it also included many interesting experiments and company visits. One of the experiments is road test a Volvo S90. The instructor of the course arranged a bus to take us to an abandon aircraft runway. And we divided into groups of three, each groups got to test drive the car in multiple runs including roll out test, acceleration and deceleration. And the computer on the car would log every variables into a file for us to analyze in the future. The course attendants are mostly interested in cars, so we were all very excited, it was one of the most interesting experience I had. We also had a visit to the world famous suspension developing company called Öhlins. It is one of the top companies in the world, it supplies various top end automotive racing championship e.g. MotoGP, F1, WSBK etc. Every motorcycle enthusiast including myself must have heard about them. But I didn't know it is a Swedish company until I learn about it! During the visit we learnt about how the damping systems in the suspension were designed and how they analyzed their own product to make sure the design is correct.

Another course I took is called Hybrid Vehicle Drive. Electric vehicles are the trend in the automotive world. The course offered many knowledge about hybrid vehicles including types of hybridization, design of the electric machines, battery technologies etc. We had a visit to Scania, since they are developing hybrid trucks right now. There are also some reports required in this course. We had to use Matlab to run the simulation of certain type of hybrid vehicles, and analyze the result to conclude the differences between each scenario. Then we had to make a report about our result and present it in a seminar. This was the most difficult task in

these 6 months, mainly because I didn't know anyone in the class and we were asked to do the report in a group of 2. I once consider dropping the course but in the end I stayed, and the instructor found me a group mate. The presentation was also a challenge for me, since I rarely spoken English in front a group of people. But it turned out better than I thought. I learnt more than merely technical knowledge, it was a really helpful course.

26-3 國外研修之生活學習（課外）

在交換期間我住的是套房式的宿舍，所以房間有廚房，為了節省生活開銷我平常都自己煮三餐，半年下來我的技術也進步了不少。飲食均衡也很重要，我也開始學著注意自己的飲食。平常上課日我比較少課外的活動，基本上就是學校、宿舍來回而已。在放假期間趁著地利之便去了一些地方旅遊，例如丹麥，瑞典可以直接搭火車到哥本哈根，大約 5 小時，很方便。在聖誕假期時我同樣搭火車到瑞典最北方的小鎮，阿比斯庫，這個小鎮以極光著名，許多遊客慕名而來，從斯德哥爾摩市區搭火車需耗時 18 小時！我認為既然人都已經在瑞典，有機會一定要去北邊看極光，很特別。如果有計畫前往，記得最好提早 1 到 2 個月訂住宿。另外歐盟內的班機價格也相當實惠，我利用聖誕假期前往荷蘭及德國旅遊，機票從瑞典到荷蘭加上德國回瑞典只需 5000 台幣，建議可以規劃利用假期周遊歐洲。多培養國際移動力。

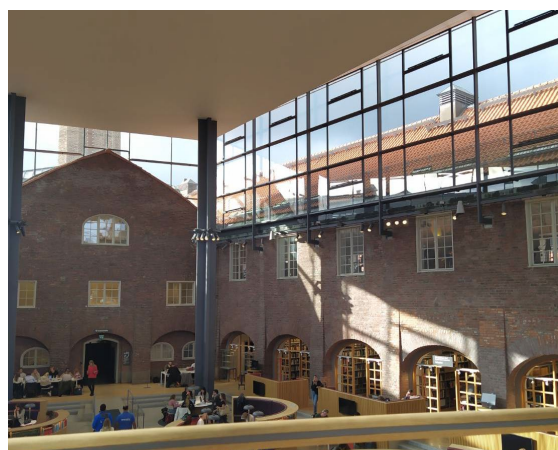
26-4 交換/研修之具體效益（請條列式列舉）

1. 增進英語口說能力
2. 增進專業知識，在交換期間修習許多碩士課程，比大學課程專精許多。
3. 接觸不同國家的學生，了解不同的學習方式或文化背景
4. 拓展國際視野，了解世界之大
5. 了解台灣的美好之處，離開後才發現台灣其實比自己想像的好
6. 確立自己的未來目標，交換期間理解到自己對於做研究沒有熱情，因此暫時不打算繼續升學。

26-5 感想與建議

這半年來我覺得自己各方面都成長不少，不管是英文能力，或是小組報告，最重要的還是車輛工程相關知識。雖然依然有些方面沒辦法突破，像是我依然不喜歡社交場合，平常待在宿舍時間也偏多，我也漸漸意識到牛牽到北京還是牛這句話的真諦。我建議出國交換的同學多多嘗試不同事物但不必強迫自己做不喜歡做的事，出國不一定要有什麼體悟或轉變，這只是人生中一個小小的經驗罷了。

26-6 相片（2~3 張貼進 word 檔案，含說明，並 Email 原檔給國際處承辦人）



KTH 校園入口一景

圖書館



上課情形