

## 學生出國研修心得報告內容大綱

請於封面上方列標題(標題內容須含：選送生研修學年度/ 學期、  
薦送學校系所、年級、中文姓名、前往研修國家及國外研修學校名稱)

研修學年度/學期	107-1
薦送學校、系所、年級	國立台北科技大學 四電資四電子
中文姓名	余尚奕
研修國家	Estonia
研修學校	Tallinna Tehnikaülikool
<p>一、緣起</p> <p>二、研修學校簡介</p> <p>三、國外研修之課程學習(課內)</p> <p>四、國外研修之生活學習(課外)</p> <p>五、與台灣學習環境之比較(請條列式列舉)</p> <p>六、研修之具體效益(請條列式列舉)</p> <p>七、感想與建議</p>	

備註：

1. 請依規定大綱項目書寫，但格式不拘，可採用圖文並茂附加插圖
2. 字數限制：至少 2,000 字以上
3. 容量限制：8MB
4. 請另附研修相關照片原檔 20 張
5. 請勿呈現重要個人資料(身份證字號、出生年月日、住址等)

## 赴外研修調查表

姓名： 余尚奕 所屬系所 / 年級： 四電資四電子

聯絡資訊(同意公開)： linkedin.com/in/shang-yi-yu/

研修國家： Estonia

研修學校： Tallinna Tehnikaülikool

研修學期： ☒ 上學期 ☐ 下學期

當地研修科系： Information Technology

研修期間：西元 2018 年 9 月 3 日 至 2019 年 1 月 26 日

### 初期規劃

選擇此校原因： 校區旁有科技園區，當地新創風氣盛行

是否有相對應科系： ☒ 是(系所名稱 Software Engineering) ☐ 否

### 赴外學校申請

何時開始準備資料：西元 2018 年 2 月 23 日

何時繳交資料提出申請：西元 2018 年 4 月 27 日

何時獲得錄取通知：西元 2018 年 5 月 4 日

申請所需資料清單(若有網址請提供)：

[https://www.ttu.ee/studying/exchange-studies/exchange-studies-incomingoutgoing/before-studies/b\\_application/](https://www.ttu.ee/studying/exchange-studies/exchange-studies-incomingoutgoing/before-studies/b_application/)

### 簽證申請

是否需要申請簽證： ☒ 是 ☐ 否

簽證費用： \$ 2880 (新台幣)

申請/核發簽證單位(如駐台辦事處)：

Police and Boarder Guard Board, Estonia

申請簽證官方網頁： <https://vm.ee/en/long-stay-d-visa>

申請所需文件(請逐一列出)：

Please Refer the website above, the insurance could be purchased from the school website. Besides those documents they mentioned, **bring the rental contract (Owner&Client both signed) with you, this would save you lots of time!**

申請所需時程：11.09.2018 (申請日期) 05.10.2018 (取得日期)

### 費用

當地學校需繳交費用

學費： 0 (新台幣)

其他項目：0 費用：0 (新台幣)

其他項目：0 費用：0 (新台幣)

### 課程與學分抵免

選課方式： ☒ 線上選課 ☐ 紙本選課 ☐ 其他：                    

選修學分數上限與下限：上限                     下限15ECT

是否可跨系選課：☒ 是 ☐ 否 ☐ 其他：                    

課程難易度：☐ 困難 ☒ 普通 ☐ 容易

學分抵免

- 是否有抵免學分：☒ 有 ☐ 無
- 學分抵免難易度：☐ 困難 ☐ 普通 ☐ 容易
- 抵免學分數：1 堂課，共2 學分
- 當地研修之課程名稱：Advanced Programming 學分：6ECT  
E-Marketing 學分：4ECT  
Estonian Language and Culture 學分：3ECT  
Basics of Physical Movement I 學分：3ECT
- 北科大抵免課程名稱：Internship 學分：2

語言學習資源：☒ 有 ☐ 無 (如：語言學習中心)

- 是否額外收取費用：☐ 是 ☐ 否

請簡單說明學習的語言、方式及申請單位等

School offer Estonian Language and Culture, just pick the course if you need it, and they offer other kind of language course as well, such as Russian. NB! Except the Estonian, other language courses you need to pay from this semester.

### 住宿

交換學校所提供之住宿選項

■交換學校宿舍

☐交換學校配合之校外租屋公司

■交換學校提供之校外租屋資訊

學校是否提供宿舍：■是 ☐否：

校內宿舍型式包含：■單人房 ■雙人房 ■其他：twin room for single

您採用的住宿方式：

☐ 學校宿舍\_\_\_\_\_人房 ☐ 寄宿家庭 ■自行租屋 ☐其他：\_\_\_\_\_

其他住宿資訊來源：☐研修學校 ☐朋友

☐網路-網址：\_\_\_\_\_

住宿費用：

您所住宿的房型費用

\$ NTD9000 (新台幣) ☐一週 ■一個月 ☐一學期

就您所知，其他房型費用：

NB! The following prices are listed by school dormitory.

■單人房：13.9 €/Night (single room) or 15 €/Night (twin room for single)

■雙人房：7.4 €/Night or 7.9 €/Night

☐多人房：\_\_\_\_人房：\$\_\_\_\_\_ (新台幣) ☐一週 ☐一個月 ☐一學期

### 交通

研修學校是否有提供接機服務：☐ 是 ☐ 否

若有，是否收取費用：☐ 是 \$\_\_\_\_\_ (新台幣) ☐ 否

學校附近交通工具 (距離可以步行距離計算)

■公車 站名： Keemia (距學校距離： 150m)

計費方式： 23 €/ month, 2 €/each time, 1 €/ each time as student

□火車 站名： \_\_\_\_\_ (距學校距離： \_\_\_\_\_)

計費方式： \_\_\_\_\_

□捷運 站名： \_\_\_\_\_ (距學校距離： \_\_\_\_\_)

計費方式： \_\_\_\_\_

□公共自行車 站名： \_\_\_\_\_ (距學校距離： \_\_\_\_\_)

計費方式： \_\_\_\_\_

□其他： \_\_\_\_\_ (距學校距離： \_\_\_\_\_)

計費方式： \_\_\_\_\_

□無

### 生活

當地平均溫度(攝氏)範圍： -20 ~ 20

校園內是否有提供無線上網(Wi-Fi)： ■ 有 □ 無

住宿環境是否有提供無線上網(Wi-Fi)： ■ 有 □ 無

當地英語使用普及率： □ 偏高 □ 普通 ■ 偏低

當地物價與台北之比較

例如：捷克布拉格 vs. 台北為 1.2 比 1 (即為當地物價比台北貴 20%)

交換學校所在國家城市與比例 1.5：1

生活用品採買地點

學校附近：請以條列式簡單說明店名、交通位置等

One Russian market is near Academic Hostel, just go across the road.

其他：請以條列式簡單說明店名、交通位置等

Google: Rimi/ Prisma

醫院診所與藥局

學校附近：請以條列式簡單說明店名、交通位置等

Google: Apotheke

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其他：請以條列式簡單說明店名、交通位置等

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### 飲食

校園

☐校內餐廳 ☐宿舍餐廳 ☐宿舍含廚房設備 ■其他： Home cook

校外

請大略分享校外附近用餐地點，並以條列式說明

餐廳名稱：\_\_\_\_\_ 類型：\_\_\_\_\_ 價位：\_\_\_\_\_ 步行距離：\_\_\_\_\_

餐廳名稱：\_\_\_\_\_ 類型：\_\_\_\_\_ 價位：\_\_\_\_\_ 步行距離：\_\_\_\_\_

其他建議

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### 其他建議

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107學年度教育部

# 學海飛颺 出國研修報告

國立臺北科技大學 電資學士班 余尚奕



TALLINNA TEHNIKAÜLIKOOL  
TALLINN UNIVERSITY OF TECHNOLOGY





107學年度教育部  
學海飛颺 出國研修報告



國立臺北科技大學  
電資學士班電子系

余尚奕 赴

Tallinna Tehnikaülikool, Tallinn, Estonia  
Department of Information Technology

03.09.2018 - 26.01.2019



Source: <https://www.youtube.com/watch?v=BIjWByXkmhM>



TALLINNA TEHNICAÜLIKOOL  
TALLINN UNIVERSITY OF TECHNOLOGY





# 緣起

打從高中開始，就一路在對著現況妥協，手上恰好握有著差不多的分數就申請進了差不多了學校，似乎有點遺憾在心中但卻沒有勇氣再去嘗試與追求。而進了大學，一開始覺得新奇有趣，於是社團活動碰了不少，似乎一群人一塊辦成了什麼，或是經歷了什麼，讓人精神上感到滿足，自己也就舒適的享受著這豐富，多采多姿的大學生活，沒意識到時光的滾輪從未停止。

有句俗話叫做溫水煮青蛙吧！開始對於課業逃避，從翹個一兩堂課，到後來幾乎不出現在教室了，一開始自己內心對於未來的迷茫，總是能很輕易的就壓回心底，並且用活動與人際取代，但隨著時間的流逝，那迷茫的逐漸成長，並伴隨著對未來的不安，似乎無法再繼續妥協下去。

大三經歷了專題的挫敗，雙二一線上的掙扎，對於工程師這個身分的抵觸以及想嘗試不同道路的嚮往，掙扎許久後決定休學跑到了澳洲去 WHV；當初的計畫很美好，可以嘗試不同的工作來找尋未來的道路，但沒想到的是現實的滋味比我想像的要殘酷許多。

沒有專業技能，沒有工作經驗，投遞起履歷除了碰壁還是碰壁，恰巧挑到了冬天前往 Perth，從連中文履歷都沒寫過的菜鳥，受到許多人的幫助完成了人生第一份履歷，也體驗了人生第一次的面試(對，第一次就英文)，頭一次扔了超過一百封的履歷，頭一次鼓起勇氣打電話，但卻聽不懂對方在說啥唯唯諾諾的掛了電話，也因為實在走投無路的在燒著銀行的存款，頭一次去嘗試掃街，上餐廳，工業區工廠一間間敲門在冷冷的眼光中詢問機會迎接拒絕。

現在回想起來，當初的不順遂真的是人生中極為幸運的一段旅程。

那是改變人生的一個半月。

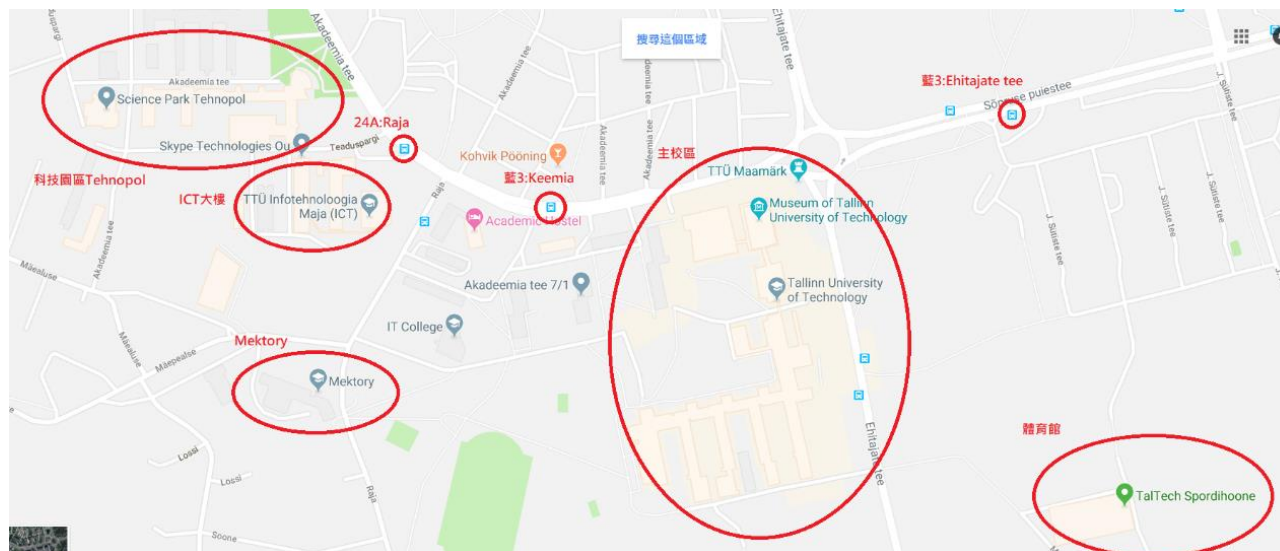
由於在澳洲體會到自身英文程度的匱乏，回到台灣就開始利用零碎的時間背背單字，這時運氣很好的開始了 CS50 的課程，英文能力也還算有所進步，同時找到自己在軟體上的興趣，與此同時也回到學校從大一的物件導向開始修起，也很幸運的遇上資工系鄭老師用他獨特的上課形式，更加深了我對於程式方面的信心及喜愛。

前文說了不少，現在回到正題，為什麼想申請交換學生呢？在回台灣後的這一年半的時間，我認為對自己的累積仍然不夠，於是透過鄭老師的幫助找到了一份實習，並且我希望這次透過交換學生的計畫，來讓自己的履歷能夠更加有競爭性。

我對於看待交換學生的方式可能比較不同，要花上十幾二十萬在國外只是生活唸書對我而言是一件很划不來的事情，畢竟現在線上課程豐富發達，只要有心都可以去嘗試；但若是同樣的機會能夠讓我有個身分來在異國找尋專業性的工作充實履歷，我認為這會很有趣。

# 研修學校簡介

就像我提到的，我想用交換的身分來找個實習來放履歷，所以當初在找尋交換學校時候頭一個鎖定的其實是澳洲的南澳大學。原因則是它網站上有標榜交換的計畫可以自費參加實習計畫；但真的去申請了，對方才告知那個計劃已經不再實施了。於是時間緊迫下要找尋替代方案，而當年有個去拉脫維亞交換的好友扔了個消失的國界的影片在介紹愛沙尼亞<sup>1</sup>，裡頭有提到這次交換目的地的 Tallinna Tehnikaülikool (下稱 TalTech) 的 Mektory，也另外看了一些官方的資料，如 work in estonia 等<sup>2</sup>，而且在校園旁就有個科技園區，因此我決定要到這裡嘗試看看能不能找份實習替自己履歷上點色。



TalTech 並不在市中心，而是處於距離老城區搭公車約 25 分鐘的位置，整個校區頗為分散，除了主要校區外(藍三公車下 Keemia)，另有位於森林間的體育館(藍 3 公車下 Ehitajate tee 步行十分鐘)，以及科技園區(Tehnopol)旁的 IT 大樓(藍三公車下 Keemia/ 24A 公車下 Raja)，最後有個叫做 Mektory 的地方，提供場地讓學生嘗試 idea 及常常舉辦專業性活動。

關於 Mektory 有個有趣的故事，我剛抵達 Tallinn 的時候待的 hostel 裡頭，有位希臘人來採訪 TalTech 的 Satellite 計畫，那時候有和他聊過 Mektory 這個地方，他提到說，這裡的產學合作相當密切，甚至有的學生在產學合作過程中就直接休學而去業界工作，讓校方有些困擾。

<sup>1</sup> <https://www.youtube.com/watch?v=Wo4JnGC-b4M&t=451s>

<sup>2</sup> <https://www.workinestonia.com/working-in-estonia/>

另外簡單提下住宿和一些學校簽證相關事宜，首先生活所需三大號，手機號，銀行帳號，稅號(簽證)。手機預付卡在超商(包括機場)都能買到，SIM卡 1 歐，開學禮包也會贈送，可根據需要加值(透過 app 或是去商店)。

銀行帳號對於交換生非必要，但這裡仍提一下開戶的方式:非歐盟成員在愛沙尼亞開戶需繳開戶費 200-250 歐不等，根據銀行而定，但 Swedbank 跟 TalTech 有簽訂協議，故可以不需開戶費，開戶前請先前往學校 Incoming office 索取相關文件，與此同時也可索取辦理學生簽證所需文件；接著前往隨意一間分行填完資料後會被要求等待將近三周才會讓你開戶，開戶後申辦 Debit Card 需要另外 5(郵寄)-10(親領)天，有說法是在 Kaubamaja 分行開戶不需要等待可直接開，有興趣可以嘗試看看，我在得知訊息時已經過了一周半故沒去嘗試。關於金融卡建議親領，郵寄有一定機率寄丟(親身經歷)，還要另外花上一周以上等。

關於 D-visa 簽證的申辦，需有歐盟境內之保險資料，可於學校描述需申請簽證的網頁上找到可申辦之公司，約三千塊台幣，線上辦理即可；除了官網上應備資料外<sup>3</sup>，請同時準備有房東房客雙方簽名的租約，並建議請先上網預約<sup>4</sup>，選擇 Apply for or extending a residence permit，或請至少於警局開門前一



小時前往排隊，較為省時，原因是警局裡頭雖有 36 個窗口，但只開放 1-2 個窗口給簽證辦理，如欲現場前往排隊等候，要做好心理準備。在此提供我的經驗做為參考，於開門前十分鐘抵達並抽到十號，從零到十號整整等了六個半小時才坐上櫃台，而同樣的，繳完資料及護照(對，會收你護照)後會被要求等上 10-14 天，但也可能更久，如我等了近一個月才收到通知。

學校部分建議先跑 SOC-129 能拿到 Uni- ID 和密碼，選課系統 Ois，校園信箱服務，Moodle，TalTech Learning Environment 都會需要這組 Uni-ID 和密碼；另外在 Student Union 可申請 TalTech 學生證(體育課用)，圖書館能申請借書證。

住宿的部分負責管理交換生的 Manager 會寄 email 並提供兩個選擇，一個在校區旁，一個在老城區旁，給交換生的價位都差不多是本地學生宿舍的三倍。之前有相關心得說到了當地之後能夠申請當地宿舍，所以我並沒有申請交換生宿舍而在抵達後直接前往宿管中心詢問，得到的答案是，交換生可以申請住宿，請直接上網登記就好<sup>5</sup>，而當下沒空房，除了當下直接開始找房外，我還有把自己放到 waiting list 上，但在一個多月後我在學校系統的申請就被自動取消了，所以往後如果不想自行找住宿的人就接受學校提供的兩個宿舍吧！



<sup>3</sup> <https://vm.ee/en/long-stay-d-visa>

<sup>4</sup> <https://broneering.politsei.ee/>

<sup>5</sup> <https://www.ttu.ee/organizations/campus/student-residence/>



# 國外研修之課程學習(課內)

由於 TalTech 的 Bachelor 是念三年，我是以大四的身份來交換，而跟 TalTech 聯繫過後得知它對於大四學生是以 Master 看待，所以我選修了兩堂 Master 的課程，分別是 Department of Software Engineering 的 Advanced Programming 及 Department of Business Administration 的 E-Marketing，除此之外還選修了 Estonian Language and Culture，Physic Basics of Physical Movement I。

以下逐一介紹：

## ITT8060 Advanced Programming –

上課頭一天教授開宗明義的告訴大家這堂課並非給初學者上的課程，而授課目的是為了能夠讓學生快速學習一門新的語言，授課的內容已 F# 為主，因為教授認為這語言很難查到相關資料；課程內容包含: Functional Programming, Railway-Oriented Programming 介紹,...等，一周主要由一堂 Lecture (1.5h) 及三堂 Lab (各 1.5h)，授課方式我認為和台灣差不多，教授上課使用投影片並會搭配簡單程式範例來做說明，但這裡的學生課上相對活躍許多；Lab 課程主要是由教授講解課後 Coursework 並讓學生能夠發問。

在這偷推一下北科資工鄭教授的 OOP/ DP 課程，相較於這裡 Lecture 的上課方式鄭教授用 mob-programming 的方式授課，navigator 及 driver 的教學可以讓想參與的學生都有能夠透過課程中所開發的專案練習 coding 及思考程式的設計，並且能夠說明並解釋程式碼邏輯，是我目前感受過最紮實且收穫最多的課程，並以此為基礎讓非本科的我能在這門碩士課程，甚至國內外實習都能很快速的上手。

由於自己交換前的實習是做 AngularJS，但這之前都接觸物件導向的概念居多，故對於 Functional Programming 的課程很有興趣，而當初的課程介紹上有寫到有 Data Science 的相關應用，於是選修這門課程。這是門作業相當紮實的課程，若本身是接觸物件導向居多的 programmer 可能會不大適應，但也因此能夠在思考 F# 邏輯的同時得到很大的啟發，對於不使用變數宣告及迴圈，改用 identifier, expression, pattern matching 及觀察函式輸入輸出 type 的方式來思考寫程式的邏輯，甚至是後期提到的 railway oriented programming 與 monad 概念都是以往未曾接觸的，因此我認為這堂課是我這趟交換最大的收穫之一。

作業成績佔總成績 45%，共九次，期中考 5% 及期末考 50%，而開學會有提到期末考需至少拿到 40% 才能 Pass，否則直接當掉，這點需要注意。作業難度蠻大的，大概從第四次作業起每份作業至少要花上 30hr 才能完成，頗具挑戰性，也很開心在學期末從教授手中拿到一個 5。



## TMM2520 E-Marketing –

會選到這堂課其實是誤打誤撞，當時誤以為這堂課是指電子商務，後來上課越上越不對勁，才發現 Marketing 指的是行銷。這堂課介紹了網路行銷的方式以及一些概念分析，並在頭一堂課課上就要求分組，提出 Business Idea，做出簡報並上台介紹，隨後每一門課則隨課程要求，會直接在課上給予時間做分組討論及製作 ppt，而在最後的兩堂課則會要求就自身的 Business Idea 提出 Campaign 以作為最後報告，及自行挑選相關主題做期末報告。

這堂課最讓我驚豔的是身旁的同學，我之前從未修過商科的課程，而這次在各自組做不同主題的 Presentation 的時候，大概有 1/3 的組別，準備的內容非常充分，口頭表達流利並能滔滔不絕，出於好奇在結束後有跟兩位我認為表現最好的同學要了 LinkedIn，發現她們都不是以英文為母語，讓我未來更想精進英文 Public Speaking。

此為八週課程，而期末考試為闡述自身對於 e-marketing 看法的申論題，就不多著墨，最後老師總成績給了 4 分。

## HLE0050 Estonian Language and Culture –

提供初學者學習愛沙尼亞文的課程，課程內容含括數字，初次見面對談，購物會話，時間表達，問句形式，節慶祝賀詞，名詞動詞型態變換等；而課上老師除了語言外也會提供一些愛沙尼亞當地的活動讓學生知道，期末考試以上課內容為主，並會要求以愛沙尼亞語寫下句子描述自己及家人朋友。



## MK3001 Basics of Physical Movement I –

如同之前的分享所述，需前往體育館報到 24 次，單次需刷三次卡(TalTech 學生證或 ISIC 學生證)，出入口開門及所進行運動之開門；並繳交三次報告，可為校際球賽的 Game Observation 或親身參與體育活動的報告，並在最後參與線上測試即可。



# 國外研修之生活學習

在國外生活跟在台灣其實差異不大，也就是食住行，人人各自為自己的生活打拼；若想在台灣有類似獨立生活或與外國人交流的體驗其實也不難，找個青旅去換宿就可以體驗了。

我的初衷是讓履歷能更加豐富，所以以下研修外的部分會分為三大類說明，分別為 Technical Event，Internship 及一個蠻有趣的計畫 Erasmus In School。

## Technical Event

澳洲的經驗告訴我除了上網投遞履歷外，掃街不外乎是最能夠努力的方向，所以這次決定嘗試參與不同專業性質的活動，藉此認識人，更新履歷，及詢問工作機會。

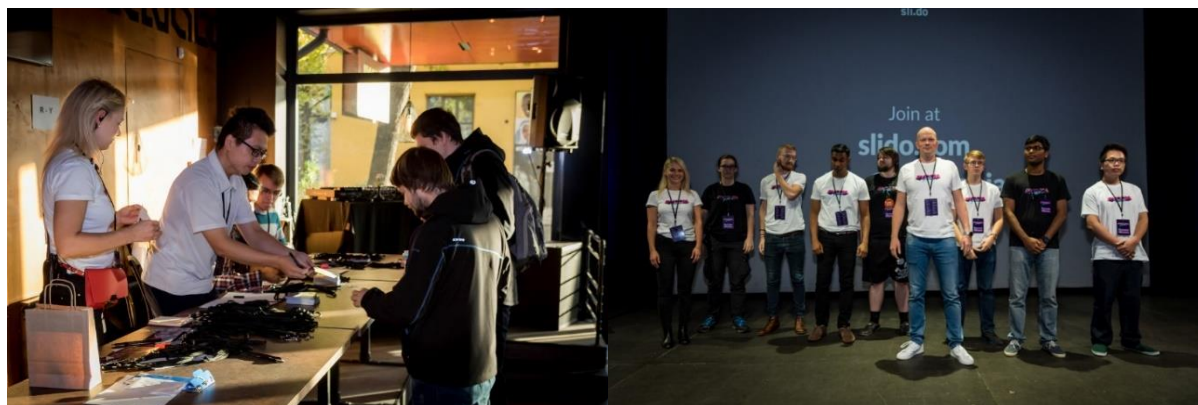
以下簡單列出參加過的活動：

### - PyCon Estonia (Volunteer)

這是愛沙尼亞第一屆的 Python Conference，由於票價不便宜，於是就透過了擔任志工的方式來參與，除了開場協助報到外，另外的職責是在會場中講台附近協助工作人員，同時努力聆聽每一場演講，除了當下最盛行的 Machine Learning 在不同領域的應用如文字分析，機器人，金融信用判斷，醫療應用外，也有不同領域的應用在此分享，如 Python 在嵌入式的應用，應用於開發時候的單元測試及 API 文件，以及以實際案例探討在商業案例中是否真的需要用到 ML，等等有趣的主題。

這是我頭一回參與到具專業性質的研討會場合，嘗試跟領域中的人士交流對我來說彌足珍貴。

有個有趣的故事，在和一位講者聊天的過程中聊到對於亞洲和歐洲對於學歷的看法，相較於台灣的升學主義，他高中畢業後就很努力找了份做 ML 的實習，接著正職工作並一路做到現在，這在亞洲的環境下似乎比較不太可能發生，他的故事對我而言是很值得思考的議題。





## - TTÜ 100 Satellite Hackathon – Satellite Tracking System (Software Developer)

如同之前提到的，我對Mektory很有興趣，這個活動就是在這個地方舉辦的。TalTech現在有個發射CubeSat也就是立方衛星的計畫，而這個計畫我認為有趣的點是，他們很努力讓所有人能夠參與。除了在校的學生參與衛星設計及製作外，讓社會大眾也有機會參加，如同這次的黑克松，開放不論是否為專業人士都能夠參與，過程中有遇上帶著女兒的爸爸，對太空有興趣的14歲的弟弟一起共襄盛舉，黑克松的規劃裡，除了衛星子系統開發外，也有規劃行銷，活動設計，未來計畫等專案來集思廣益，並讓社會大眾能夠參與。

除此之外TalTech對於發射這顆衛星的運用也讓我嘆為觀止，除了讓在學生有題目來做學士碩士論文外，對下一代的教育也有考慮到，他們規劃了個活動給愛沙尼亞的小學生們；這會是一個比賽，在未來衛星發射進入太空後，上面會攜帶愛沙尼亞歌曲的片段，而在愛沙尼亞境內的小學會由政府提供天線讓他們能夠嘗試從衛星上下載對應的片段，而學生能夠嘗試透過從太空中下載的片段來還原出原本的歌曲，藉此來培養學生對科技的興趣。

而這次我參與的專案是開發對衛星的天線追蹤系統，組員有兩位愛沙尼亞人及一位日本人，使用Python做為開發工具。這是個蠻有挑戰性的議題，要求是要能夠用電腦下command來操作一台校方提供，二十年前出產的天線旋轉儀。而校方只有提供一份原廠的簡易手動操作手冊。而困難的地方在於我們沒有實際天線來做測量，而儀表上的數值是透過實際天線的轉動而顯示，好在隔天Mentor有提供可變電阻來代替天線，而我也根據手冊上的電路圖找到對應的接口，藉以成功操作儀器並能量測其變化。這次專案彼此分工合作，來自Tartu University的當地朋友負責開發用Python script來操作儀器的功能，而我則負責找尋校方提供的repository中計算衛星軌道的演算法並寫成物件，最後再一塊討論並結合雙方的物件開發出能操作儀器的command line interface。





## - Garage48 Hardware & Art Hackathon – 'mOkay (Software Developer)

Garage48是一個以舉辦黑克松為主軸的團體，愛沙尼亞有部分新創是從這的活動走出去的。而這次我參與的活動是在其在Latvia的首都Riga，於Rīgas Tehniskā universitāte也就是里加工業大學合作舉行的黑克松。由Garage48召集，並由RTU提供材料及場地，讓參加者能夠實現自己的主意。相較於前一個黑克松是由主辦方訂定題目，由Garage48舉辦的黑克松則是由參加者能夠自行對idea做pitch，在藉由組隊來在周末把雛形打造出來。

就像在TalTech中有Mektory一樣，這次的場地是在RTU中的Design Factory，而一開始有pitch idea的人數約有30人，最後成功組出隊伍的有15組，我參與的組別是'mOkay，目的是為了替獨居長者設計一個IoT device，以連動到家屬手機及當地社工團體，以確保長者每日都是安好的狀況。

這次的團隊成員有總共有十位，來自拉脫維亞，愛沙尼亞，烏克蘭，亞塞拜然以及台灣的我。這次則是嘗試了Raspberry Pi和Arduino進行開發，結合WordPress的網頁來進行呈現。

我參與的是以Python和Raspberry Pi來開發發送簡訊及寄送資料給網頁後端的API，這次的挑戰主要是以往從未碰過Raspberry Pi，而組員們和Mentor也對於其不太熟悉，故花了較多的時間在做環境建置，在開發過程也因為找尋所需功能的module花了不少時間，可惜本想做出打電話功能但並沒有實現，而Arduino組則透過SIM module做出來電話功能，所以最後的final pitch是結合兩組的成果來進行demo。



透過這些課外的活動與實作，除了能在履歷上增添項目外，主要讓我感受到的是自身知識的力量；在兩次的黑克松中，我知道了學校的教育能讓我快速的對新事物上手並且在短時間內分析問題並做出有一定架構邏輯的程式碼，同時也獲得了在以英文為主要語言下進行溝通與開發的經驗。

同時對於仍在校並對自己學習及未來感到迷茫的學弟妹學長姐們，有機會可以嘗試找能夠動手的機會，可以是自己的idea也可以是他人的，或許能夠幫助自己找到方向及成就感；亦或是能夠作為替自己設立停損點的實驗。

有興趣的人可以參考final pitch的直播<sup>6</sup>，裡頭有不少有趣的idea都在短短時間內被實做出來，無論是想改變什麼或是純粹是好玩，有時候讓行動取代思考，或許也是不錯的選擇。





# Internship

其實前述提到的活動會去參加的原因是想去找尋實習的機會，從自身過往經驗知道，除了上網投遞履歷，詢問現有的關係外，就是掃街了。

有趣的是，儘管參與不少活動，也讓自己的LinkedIn從出國前的10位提升到將近一百，但其實到十月底的這兩個月以來，嘗試都是沒有結果的。

打算要放棄的時候接到了個面試通知，和面試官小聊的衛星黑克松project裡的物件導向概念後，拿到一份實習並在十一月初開始上班。

同事來自俄羅斯，美國，烏克蘭，愛沙尼亞和奈及利亞，辦公室算是蠻開放的，能挑選自己喜歡的地方工作，工作時間也非常自由。

而工作的部分與自己上一份實習有蠻大的不同，上一份實習是以自行透過研讀repository來了解結構並且於其上建構出另外的feature頁面；這次的任務為從無到有架構出瀏覽器的UI畫面。

由於自己本身並沒有碰過React，俄羅斯mentor從旁給與不少協助，他整理了不少相關學習資源，並且對於React的概念，如props，component，life cycle；JavaScript的Hoisting，Scope，Closures，event loop等概念能夠提供材料並協助闡明。

而我也從一開始的做出一個可以lazy loading的table，到能夠與UX及後段同事合作做出一個一個有header，search bar等component的前端畫面。

此外也把握機會向負責區塊鏈的同事請教相關的知識，並與他討論關於中本聰的bitcoin.pdf<sup>7</sup>與拜占庭問題等文章，算是蠻有趣的經驗。

對我而言學習到最多反而不是專業上的知識，而是對於同事的觀察。了解到美國同事對於經營辦公室氛圍的努力及和他人相處的方式，同事之間的互動以及對自己work-life之間的把握，同樣是實習生的當地女孩子，展現出來的語言能力，應對進退，待人處事及對自己文化背景的理解，都是我未來想要努力的方向。



<sup>7</sup> <https://bitcoin.org/bitcoin.pdf>

# Erasmus In School

這偶然看到的一個活動，主要目的是邀請交換學生到愛沙尼亞當地的高中上課。因為知道台灣有個叫沙發客來上課的計畫(邀請沙發課到台灣國高中進行分享)，覺得這樣的活動很有趣也或許能對他人有幫助，就報名了。

在準備投影片的時候頭痛了許久，因為不曉得該放入什麼樣的元素，才能對學生有幫助或引起共鳴，除了請教台灣朋友的建議外也請教了周遭愛沙尼亞的同事朋友她們的意見，也因此讓我更加認識自己的家鄉。

最後我決定簡單的介紹台灣的環境，相近的處境，土地面積及相較於愛沙尼亞很極端的人口數目來引起注意，介紹天氣及台灣的應試升學制度及分享我自身休學Gap的歷程。

希望他們能夠知道一來世界很大，有很多地圖可以去探險(World is HUGE)，二來是身為學生，分數一定不是絕對的，找到一件能在努力後覺得快樂的事物才是重要的(Go find what make you happy after hard working)

另外我有觀察到一件有趣的事情，是關於學生和老師對於愛沙尼亞語的討論，學生和(英文)老師聊說認為愛沙尼亞語的使用率不高，英文相對有幫助，而老師的回應讓我覺得很有意思，她很正面的向學生闡述學習愛沙尼亞語是值得驕傲的事情，並提及該以什麼態度來面對自身文化；再加上其保存良好的世界遺產(老城區)，對比台灣對於台語及傳統文化的態度，我認為是值得學習的。



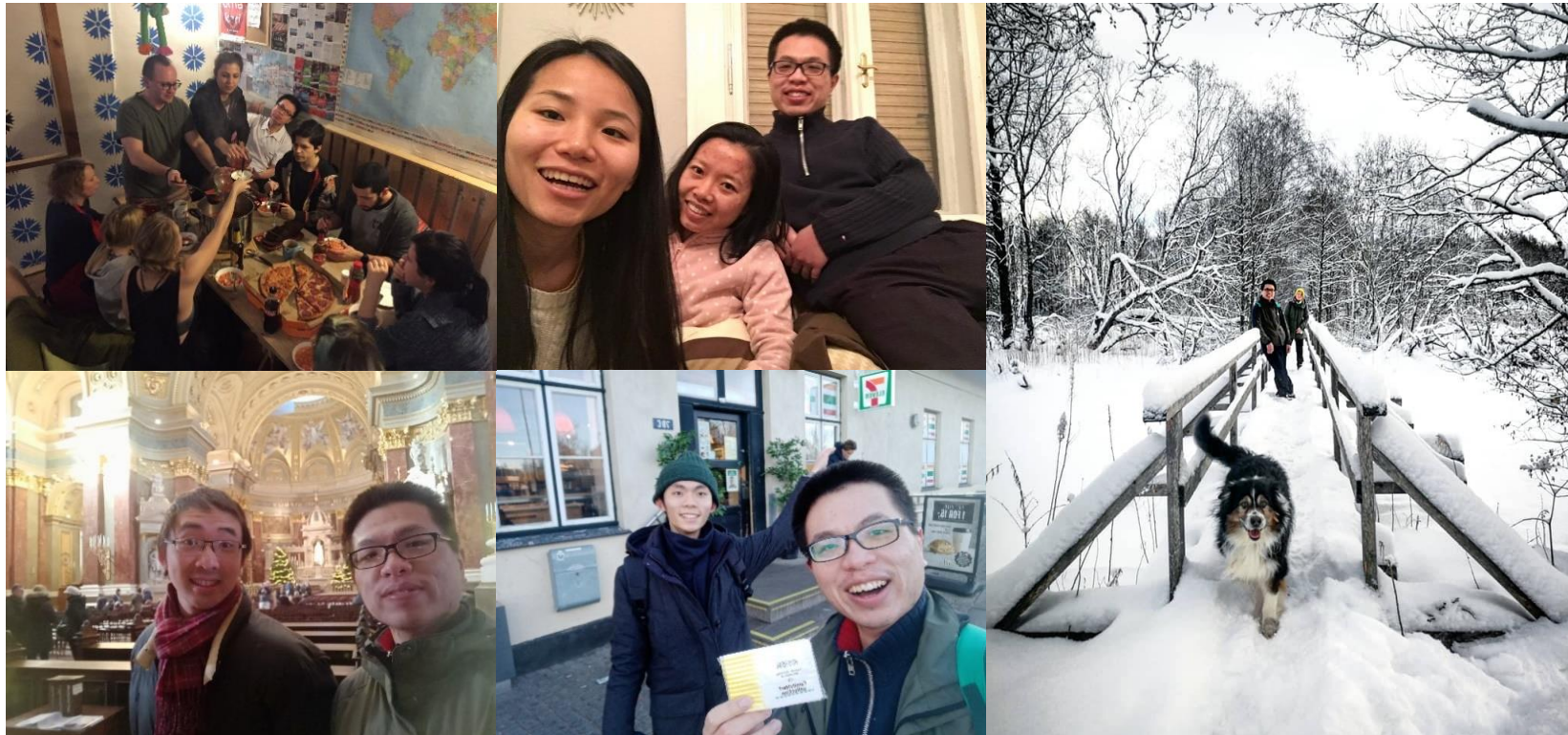


# 與台灣學習環境之比較

- TalTech 擁有體育館並可自由選擇欲上課的時段及項目
- 期末考時間彈性，有數個時段可選擇，也會替交換生特別安排時段
- 北科的 Programming 課程真的很棒!
- 學生組成相對多元，容易與不同國家同學互動

# 研修之具體效益

- 豐富履歷
- 頭一次參與研討會黑克松
- 頭一次在國外以專業求職並工作
- 頭一次讀 Paper
- 反思在台灣所能獲取的資源及求職方式
- 獲得新的效仿對象及學習目標
- 探訪朋友



# 感想與建議

在此提供沒有電鍋的同胞們使用爐火及一般鐵鍋煮飯的方式，rimi 或 prisma 找包看得順眼的米，建議挑個 long-grain rice，1kg 基本上都不到 1 歐元，米和水的比例 1:1.3~1.5 丟進鍋子滴點油加蓋後小火煮滾，等水煮乾後稍微悶個幾分鐘就是一鍋白飯了，一包 1kg 的米基本上可以吃個好幾次沒什麼問題。

啊那個，人生其實就跟 RPG 一樣啦，只是比較難又沒有攻略，地圖很大，事件很多，NPC 講的話你不一定聽得懂；多參考別人的玩法，創造你自己的遊戲方式，是還蠻有趣的啦。（但還是很難就是了

# Why Exchange Student

I never really pursued something since high school. I didn't have a specific target that I wanted to make or achieve. I let my life followed the flow of the society, studied, test, applied the school according to the score. Why should I do these? I didn't know.

In university, I tried some activities and club. Those were new and fun, a group of people experienced or hosted something, then enjoyed the short happiness and accomplishment. Time flew but life never really started.

I started to skip the class, from one or two per week, then almost never showed up. I started to feel confused about the future, but those worries could always easily cover by different activities and people, one after another.

The consider slowly grew up, I knew that I needed to face it someday, but not now.

The third year of university came to me, I couldn't handle the independent study, and almost get flunk out because of the bad grade. Also the suspect of being an engineer and the expectation of different careers stayed in my mind. After the struggle and some research, I decided to suspend one year of study and went to Australia with Working Holiday Visa. The very first decision in my life with expectation. And the reality destroyed the expectation in my first two Oz weeks.

Without any professional skills, working experience, I didn't even know how to write an English resume. The winter of Perth taught me the rule of the real society. I got help from one German, two Canadians, and one Iranian, so I could finish my resume. I sent more than a hundred resume. I tried to call and got hanged up because of poor English.

I experienced the first interview in my life and I couldn't even understand the question. My original plan about doing different jobs and then choose one from them, was so funny at the moment. I couldn't even get a job.

The bank amount dropped rapidly and the stress hovered me. I started to go on the street knocked on each door and ask for job. I went to restaurants and factories, knocked on the door and opened my mouth to ask, got the rejection and moved on to next door.

Now I really appreciated the time, that one and half month changed my life, taught me the rule of reality.

After the trip to Australia, I learnt English, studied CS50, and took CS course at Taipei Tech, I met Professor Cheng, with his lecture I started coding from scratch and enjoyed.

Okay, so why exchange student? After one and half year study, I thought it's time to get some practical experience. I did an internship in Taiwan with Professor Cheng's help. My next plan was to find an oversea internship via this exchange student program. I believed this could make my resume more competitive.

My perspective of exchange student program might be a bit different. To spend one or more than two hundred thousand to live and experience study abroad seemed not that a bit too expensive. But if I could use the opportunity to look for professional working experience, this might be worth.



# University Study

Because the bachelor in Estonia is a three program, as a senior student I could take master course according to the incoming office coordinator. I joined the department of Information Technology and took two master courses, the Advanced Programming and E-Marketing. Besides the two, I took Estonian Language and Culture and Physic Basics of Physical Movement I.

## ITT8060 Advanced Programming –

At the very first class the professor said that the course is not for the beginner, and the learning outcome of this course is to let student be able to quickly learn a new programming language. The course is taught in F# because it's hard to get related information on the Internet. The course content included Functional Programming, Railway-Oriented Programming, Pattern matching, Tail Recursive, Test Generator, etc. The course is composed of Lecture and Lab and each takes 1.5 hour. The Lecture is similar to Taiwan, and Lab is mainly focus on Coursework explanation and related questions.

I need to mention the Objected-Oriented Programming and Design Pattern course that taught by Professor Cheng, Taipei Tech. Professor Cheng use mob-programming during the lecture, students play the roles of navigator and driver. Students could participate in the lecture coding, think about the software design and discuss with each other. These courses give me solid fundamental and the ability to understand and explain code. The training gave me the capacity to work on this Master course, and the internship both in Taiwan and Estonia.

Functional Programming is the main reason that I choose the course. My previous experience is mainly related to Objected Oriented Programming, C++ in the school and AngularJS in the internship. Advanced Programming gave me a totally different perspective to solve the problem. Not using variable and loop but pattern matching and type observation. The concepts of Railway-Oriented Programming and maybe/ either Monod are really open my mind. I think this course is the biggest reward in this exchange period.

The coursework is 45% of final result (5% each), midterm is 5% and final is 50%. You should at least get 40% in the final in order to pass this course. The coursework is quite hard, I spent 30 hours on each coursework since coursework4. And I'm happy that I receive a 5 in the final score.



### TMM2520 E-Marketing –

To take this course is by accident. Somehow I consider e-marketing as e-commerce at beginning, but just realized that the e-marketing is literally marketing, not e-commerce. The course introduces how to use Internet to do marketing and concept of different methods of marketing. The professor asked students to form groups and create a presentation about business idea at first course. Students practiced different concepts in each courses based on the business idea via presentation or content writing. The requirement of the last two courses is to create a campaign for the business idea, and to give presentation about topic related to e-marketing.

I was quite surprised by my classmates because of their public speaking ability. About 1/3 groups prepare sufficient content and be able to give a fluent speech without any hesitation after short time discussion during the course. After talked to two of the best speakers during the course, I realized that both of them are not native speaker. This makes me want to keep improve myself in the future.

This course is eight weeks long, and the final is essay questions related to e-marketing. My final result of this course is 4.

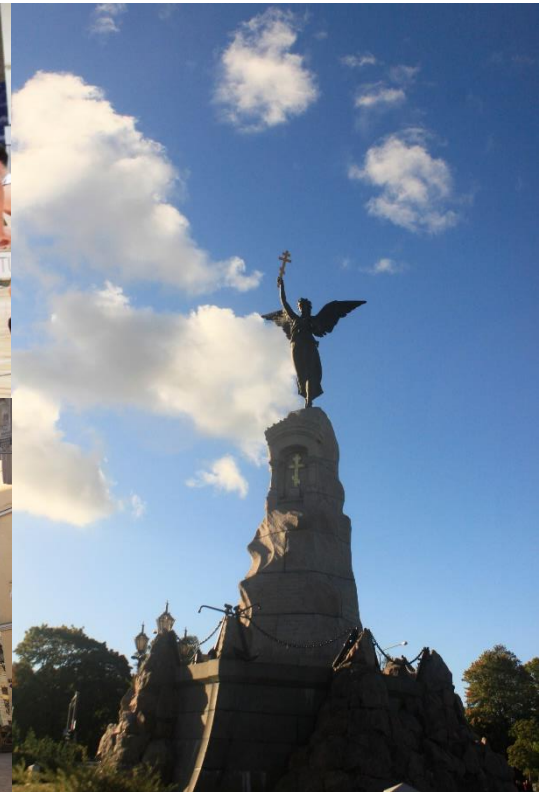
### HLE0050 Estonian Language and Culture –

This course is the for beginner, the topic related to number, conversation in different occasions, time, question sentences, holidays, transformation of noun and verb. The teacher offers information about local activities as well. The final is related to course content and sentences related to yourself, family and friends written in Estonian.



### MK3001 Basics of Physical Movement I –

Like the previous sharing, you need to go stadium 24 times, each time verify the card three times, and to write the three report about game observation (or you could participate sport activates). and You need to take the final test online.



# Extracurricular Activates

Living abroad is similar as living in Taiwan, you need to figure out food, living and transportation. Everyone works for their own life. If you just want to live independent or interact with foreigners, the easiest way is to find a hostel to work or to volunteer.

My purpose of this exchange period is to grow my resume with international experience, I'll explain my extra-curriculum activities via the following, Technical Event , Internship and one funny project, Erasmus in School .

## Technical Event

My Oz experience gave me the example of how to get a job. Go out and ask people is probably the only way that you could keep working on. So I try to attend different professional event, know people and update my resume, prepare for the opportunity.

There are three events I'd mention.

### - PyCon Estonia (Volunteer)

This is the first Python Conference in Estonia, I participate as a volunteer because of the ticket price. I served as registration and working near the stage. The topics related to different field, for the popular subject machine learning, there are language analysis, robot application, financial insurance and medical application. Also the application of embedded system, unit-testing and API documentation and some real project sharing discussing about should we use ML or not.

This is my first time participate in this kind of professional occasion, the chance to talk with people in the field is valuable.

There's a interesting story, one of the speaker shared his experience of being a machine learning engineer. After he got his high school diploma, he worked on himself to learn knowledge related to machine learning. Then he started to networking and finally got a internship related to ML, and worked as ML engineer till now. He said that this is kind of impossible situation in Asian country because everyone bind your ability with the diploma such as Master or PhD.





## TTÜ100 Satellite Hackathon – Satellite Tracking System (Software Developer)

Like I mentioned before, I am interesting about Mektory in TalTech, and this activity was hosted in this place. TalTech has a project to launch a CubeSat. This topic of this hackathon was hosted by this purpose.

This hackathon is not only open for those developers but for people who would like to participate into the project. I saw there were father came with his daughter, a 14-year-old young boy who was interesting in space. The topics of this hackathon related to develop the sub-system for CubeSat, marketing, event organizing and brainstorm for next satellite project. These topics let all the different generation of society could participate and work on the same issue together.

For this CubeSat project, they tried to gain the biggest benefit from it. Besides the student thesis for Bachelor and Master, they considered the education about next generation as well. They designed an activity for elementary students, the CubeSat would carry songs to the space, the songs would be cut into thousand pieces. The government would give elementary schools antenna, that students could use to download the song pieces from the Satellite. This could bring up students' interest about technology and space.

I participated in the project of developing antenna tracking system. Our team consisted of two Estonian and one Japanese. We needed to use Python to control one 20-year-old device to rotate according to the orbit of the CubeSat. We first worked on how to control the device via Python command because it obviously had no interface with computer. After the research of the brochure and electronic circuit, we figured out how to controlled the device via computer and Python code. But we couldn't test if the device was working properly because we didn't have a real antenna to install on the device. To solve this problem, we used potentiometer to simulate the antenna rotating. And finally create a solution of this project. We worked as a team, two of us worked on using script to control the device, another two worked on the algorithm of computing the orbit from existing repository. And we combined the results and worked on the command line interface of the final program together.



## - Garage48 Hardware & Art Hackathon – 'mOkay (Software Developer)

Garage48 is an organization of hosting hackathon events. Some of the Estonia start-up comes from these hackathons. Garage48 Hardware & Art Hackathon was hosted in Riga, Latvia, cooperated with Design Factory in Rīgas Tehniskā universitāte (RTU).

Garage48 organized the activity and RTU provided the place and all the materials for all the participants turned their idea into prototype. This hackathon was different than previous one because the topic was totally decided by all the participants, not restricted in one specific topic.

The number of people who pitched ideas was more than thirty, and thirteen of them successfully formed teams. This time we're a team of ten, our idea was to create a simple device with three buttons, that could secure our lovely elder in their daily life. Members came from Azerbaijan, Estonia, Latvia, Ukraine. We tried to develop with Raspberry Pi and Arduino, combined with the WordPress website to render the result.

I joined the Raspberry Pi team to develop SMS function and sending data to our web application. The challenge this time was that no one used Raspberry Pi before, and the mentor was not familiar with this as well, so we spent a bit more time on research and environment setting. The research of necessary function also took us lots of time because most of the service related to telecommunication needed money. We successfully created the device that could send SMS message and connected it with web application, but failed to implement calling function. But our Arduino team implemented the calling function via SIM module at the end. Our final pitch demonstrated the demo with two devices.



Through these activities and projects, besides adding local experience on my resume, I learnt that my knowledge was really powerful. I started to realize that the education I took before help me face the challenges without flurry. I could find out the tools and utilize my knowledge on them very quickly. I could analysis the problems and create structured code and I could cooperate with different people as a team.

For those who're still studying in school and may feel confused about their courses and future, please try to find the chances that you could really make something. The idea could be yourself or belonged to others. You might be able to find the direction and accomplishment from those challenge, or you could decide if you'd like to stop current attempt and turn to other direction.

If you had time, please check out the final pitch<sup>1</sup>, there're interesting ideas been implemented in 48 hours. No meter it's for fun or to change something, tried to create something may lead funny consequences and make you more clear about yourself.





# Internship

As I mentioned before, the purpose that I attended those events was to seek an internship. According to my previous experience, after sending tons of application online, asking for current relationships; going out and knocking the doors on the street is the only thing I could do.

Although I'd tried different technical activities, open door days, and grew my LinkedIn connection from 10 to almost a hundred, the effort of first two months returned nothing to me.

At the moment that I almost decided to give up, I received my very first interview from my last application. After a brief discussion about the satellite project, I received the offer and started to work at the beginning of November. Never give up, right?

My colleagues come from Estonia, Italy, Nigeria, Russia, Ukraine and USA. The office is like an open space, people choose where they would like to work. We have tea, coffee and a huge smart TV, which brought us a wonderful Christmas Karaoke.

The working part is quite different from my previous experience. I learnt mainly from the repository to understand the structure and gain code tracing ability, then created new feature based on existing repository in previous internship; This time my task is to build a Browser UI that renders BlockChain from scratch with React.

At my journey with React, my Russian mentor gave me lots of assistance via articles and our discussion with some concept such as hosting, scope, closures and event loop.

During this two months, I started from building a lazy loading table, after the cooperation with UX and backend colleagues, I finally create the browser UI that composed of different components.

Besides the task, I tried to learn some BlockChain knowledge from the colleague who responses to smart contract. I studied Satoshi Nakamoto's bitcoin.pdf and byzantine problems, which was quite a unique experience for me.

In this internship, I'd say that I learnt a lot from both technical side and non-technical side, I saw the effort of a colleague that tried to bring the office together, the refined manners from a colleague who was even younger than me, the interaction between colleagues from different background. These would definitely be the nutrition of my future life.





# Erasmus in School

The purpose of this event is to invite Erasmus student to share their experience in Estonian high school. Because I knew a similar project in Taiwan which is called “Coachsurers in Class”, I decided to join this meaningful and funny activity.

Before driving more than 200km to Karksi-Nuia, I thought a lot about what should I share with local students, I tried to ask for favor from my Estonian friends about their high school education and what kind of stuff that they may need but can't get from school.

My presentation started with a brief introduction about Taiwan tried to draw their attention with similar land area but huge different populations the weather and the education system in Taiwan, my personal experience in my gap year, and end with traditional blessing from my hometown.

I tried to share them two concepts, first is that the world is huge, and the second is that, score is not everything, try to find one thing that makes you happy after you work hard is more meaningful in your life.

And there is one interesting thing happened during the break, students argued about the reason to learn Estonian with their English teacher. Students said that English is more useful than Estonian and not that much people using Estonian in the world. The teacher response is pretty cool. She said that learning Estonian is one thing that we should proud of because we're Estonian and this is our language. She showed the attitude of how Estonian treated their own culture. And they delivered the pride to their younger generation. This is exactly what we need to learn from Estonian, the attitude of facing traditional culture and heritages.



# The Comparison with Taiwan

- There is stadium in TalTech, students could choose courses and time.
- TalTech offered more than one session for finals, and some especially for exchange students.
- The programing course in Taipei Tech is awesome!
- Students diversity is better than Taiwan.

# Study Benefit

- Update resume
- First time in my life I attend conference and hackathon
- First time in my life I look for professional job and work
- First time in my life I read paper
- Think about how could I get resource in Taiwan
- New target for me to pursue
- Visit old friends



# Advice

So here is the method of how to cook the rice with normal pot. Go pick a package of rice such as short-grain rice. Then take one cup, after wash the rice, mix rice and water with the ratio 1:1.5 into pot. Cover the put after put some oil, then boil it with small fire. When there is no water in the pot, turn off the fire and wait for a couple minutes. Voilà! The rice is done.

You know what, the life is just like a RPG game. This game is hard, no walkthrough, almost infinite map, a bunch of events and sometimes you can't understand the NPC's language. But it is still a game, please go refer how other people play their games, create your own walkthrough and have fun with your life. (But it's still hard, for sure.