



# ASPIRE Forum 2017 Student Workshop

## Student Report

**ASPIRE FORUM 2017**  
Sustainable and Liveable Cities  
Student Workshop, 9-15 July 2017

	9 July, Sun	10 July, Mon	11 July, Tue	12 July, Wed	13 July, Thurs	14 July, Fri	15 July, Sat
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0800	Arrival of Students to NTU Campus	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
0830		Workshop	Workshop	Workshop	ASPIRE Symposium (ASPIRE Students to Attend As Well)	ASPIRE Students' Presentation to VPs & Senior Staff	Check-out
0900							
0930							
1000							
1030							
1100							
1130							
1200							
1230		Lunch	Lunch	Lunch	Lunch	Closing Lunch	Depart for Home Country
1300						(for VPs, SS & Students)	
1330		Visit	Visit	Visit	ASPIRE Students' Preparation for Presentation	<u>Half-day Singapore City tour</u>	
1400							
1430							
1500							
1530							
1600							
1630	Dinner	Dinner	Dinner	Dinner			
1700							
1730							
1800							
1830							
1900							
1930	Student Group Discussion	Student Group Discussion	Student Group Discussion	Student Group Discussion			
2000							
2030							
2100							
2130							

**Report on the Completion of Study Abroad  
(for short-term program of 3 months or less)**

(Report Date                      17/07/20)

Study abroad program name	<b>ASPIRE Forum 2017 Student Workshop</b>
Affiliation at Tokyo Tech	School of <u>Environment and Society</u> Dept. of <u>Civil and Environmental Engineering</u> Year: <u>1</u>
Name	W.M.
Country of study abroad	Singapore
Overseas affiliation	Nanyang Technological University
Period of study	Period in the program:                      17/07/09    to    17/07/15 Period spent overseas:                      17/07/09    to    17/07/15

# Report

## ① Overview of the program and my study abroad destination

The Asian Science and Technology Pioneering Institute of Research and Education (ASPIRE) League is a consortium of five leading science and technology universities in Asia, the Hong Kong University of Technology (HKUST), Korea Advanced Institute of Science and Technology (KAIST), Nanyang Technological University (NTU), Tokyo Institute of Technology (Tokyo Tech), and Tsinghua University (Tsinghua). ASPIRE Forum is organized by ASPIRE League every year, and it consists of student workshop, symposium and student presentation. This year, it was hosted by NTU, in Singapore, during 7<sup>th</sup> to 15<sup>th</sup> of July, 2017.

NTU, located in the western part of Singapore, is a young, active and research-intensive university, and has grown on an ever-increasing speed recent years. From the Changi Airport, it took around 1 hour to arrive NTU campus by taxi. The campus of NTU is like a park, with large area covered by plants. There are several lines of campus buses, which are free, and public buses passing through the campus, which makes the transportation very convenient, even though it's a huge campus.

As scheduled in the following programme, students attended lectures and participated in site visits on the theme "Sustainable and Liveable Cities". We were divided into 5 groups, 6 students from 6 different universities in one group, and conducted intensive group discussion for final presentations related to the workshop theme, and delivered them to the ASPIRE League's Vice Presidents on the final day of the ASPIRE Forum.

<b>ASPIRE FORUM 2017</b> Sustainable and Liveable Cities Student Workshop, 9-15 July 2017							
	9 July, Sun Day 1	10 July, Mon Day 2	11 July, Tue Day 3	12 July, Wed Day 4	13 July, Thurs Day 5	14 July, Fri Day 6	15 July, Sat Day 7
0800	Arrival of Students to NTU Campus	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
0830							
0900							
0930							
1000							
1030							
1100							
1130							
1200							
1230							
1300							
1330							
1400	Welcome dinner &Icebreaking games	Workshop	Workshop	Workshop	ASPIRE Symposium (ASPIRE Students to Attend As Well)	ASPIRE Students' Presentation to VPs & Senior Staff	Check-out
1430							
1500							
1530							
1600							
1630							
1700							
1730							
1800							
1830							
1900							
1930							
2000		Lunch	Lunch	Lunch	Lunch	Closing Lunch (for VPs, SS & Students)	Depart for Home Country
2030							
2100							
2130							
		Visit REC Singapore	Visit NEWater	Visit Rolls-Royce Plant	ASPIRE Students' Preparation for Presentation	Half-day Singapore City tour	
		Dinner	Dinner	Dinner	Dinner		
		Student Group Discussion	Student Group Discussion	Student Group Discussion	Student Group Discussion		

Figure 1 Schedule of ASPIRE Forum 2017

## ② Preparations before your study abroad

After screening result being announced, there were still many procedures to be done before going to Singapore. Those procedures, including overseas insurance application, application for stipend provided by Tokyo Tech, and visa application (Singapore visa is needed only for some nationalities including Chinese), etc., were actually a lot and a bit confusing because of different deadlines and different divisions to submit to, but Ms. Sai in the International Cooperation Division of Tokyo Tech,

prepared us a comprehensive guideline, for those procedures. I successfully got Singapore visa through VFS Global agency, thanks to the letter of introduction provided by NTU coordinator, Ms. Sophia and the assistance from Ms. Sai.

Also, before the program, Ms. Sophia, and her colleagues kindly provided all participants Logistics Details for our references, including accommodation, transportation and preparations for things to bring, which turned out to be really helpful. I really appreciated the help and assistance provided by coordinators of Tokyo Tech and NTU.

All preparations done!



Figure 2 Tokyo Tech team (9<sup>th</sup>, July, NTU)

### ③ Activities of ASPIRE Forum



**Figure 3 Group photo after ice-break games (9<sup>th</sup>, July, NTU)**

The program started with a warm and interesting welcome party on July 9<sup>th</sup> evening. Nice gifts, and delicious food were provided by NTU, and ice-break games organized by NTU staff and students were really fun and did break the ice among students who never met the others before.

During 10<sup>th</sup> to 12<sup>th</sup> of July, every morning, two lectures were provided by professors, researchers or staff from NTU, NUS and Singapore government, giving us enlightening introduction of main aspects concerning sustainable and liveable cities, listed in the following table 1. All these **lectures** were very interesting, informative, and inspiring. Future vision of mobility in Singapore was described to be mainly consisting of autonomous vehicles, and a future town center with self-driving vehicles was depicted; Strategies for urban freshwater management in Singapore was proposed, integrating rain, catch, clean, beautify and activate all these keys points together; A broad and comprehensive concept of sustainable city was presented, with consideration of water, energy and land, which are the three problems Singapore is facing; Technical knowledge of advanced materials towards energy solutions was clearly introduced; The livability framework shown was amazing, all aspects that I can think up have been considered or even put into practice in Singapore, management, knowledge platforms, research projects, etc.; Current situation and the future of water in Singapore were described clearly, and the role of applied research and technology was said to be essential.

**Table 1 The list of lectures in ASPIRE 2017 Student Workshop**

<b>Lecture 1</b>	<b>Singapore Autonomous Vehicle Initiative (SAVI) and Future Singapore Urban Mobility</b>
	Mr. Niels de Boer <i>Programme Director, Future Mobility Solutions (Autonomous Vehicles), Energy Research Institute @ NTU</i>
<b>Lecture 2</b>	<b>Building Water Resilience for Urban Environments Based on Modern Ecological Approaches</b>
	Associate Prof Sanjay Swarup <i>Graduate Programme Director, Deputy Research Director (Environmental Engineering), The Singapore Centre for Environmental Life Sciences Engineering (SCELSE)</i>
<b>Lecture 3</b>	<b>Building Sustainable and Liveable Cities</b>
	Dr Yeoh Lean Weng <i>Director, Urban Solutions &amp; Sustainability, National Research Foundation (NRF)</i>
<b>Lecture 4</b>	<b>Advanced Materials Toward Energy Sustainability Solutions</b>
	Prof Lee Pooi See <i>Associate Dean (Faculty Recruitment &amp; Development), College of Engineering, NTU</i>
<b>Lecture 5</b>	<b>Liveable and Sustainable Cities</b>
	Mr. Khoo Teng Chye <i>Executive Director, Centre for Liveable Cities</i>
<b>Lecture 6</b>	<b>Singapore's Water Journey: Road to a Global Hydro-hub</b>

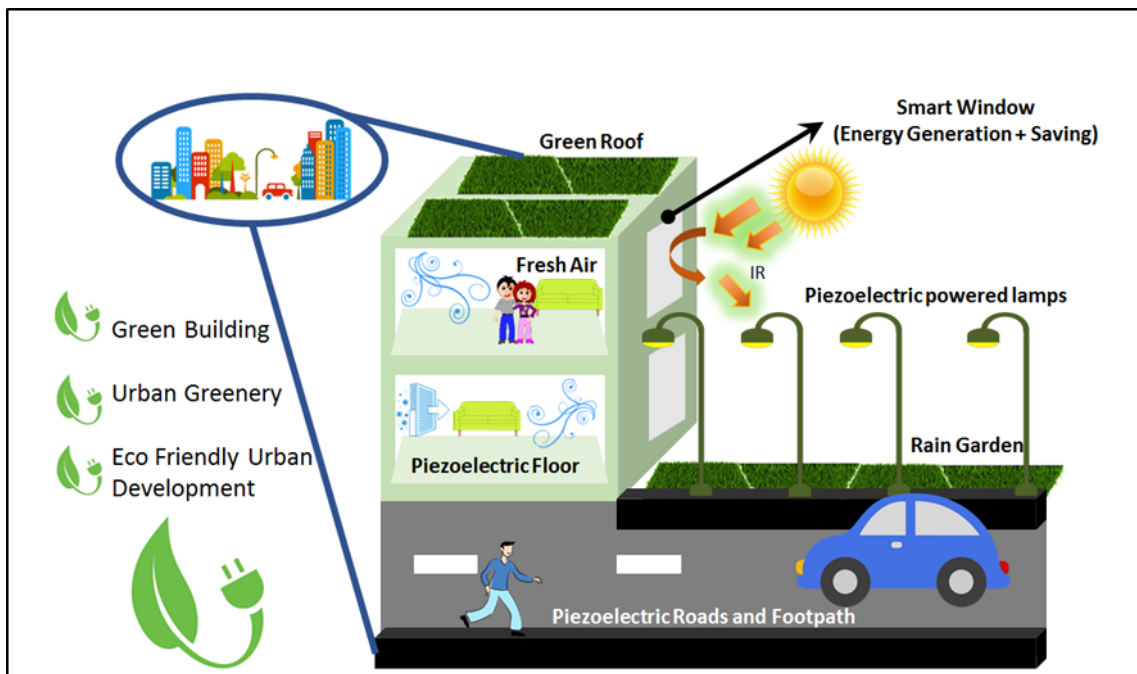


In the afternoon, site visits were organized by NTU, and we were guided to REC Singapore, NEWater, and Rolls-Royce Plant. REC Singapore is aiming at sustainable production of clean energy products, and has been a pioneer in the solar industry. At **REC**, the director in charge of research and technology gave us an overview of advanced technology in REC solar panel development. Then REC staff guided us to solar panel manufactory, explaining the processes of solar panel production, and it was amazing for us to know that robots do the most works while workers are only responsible for checking the quality. The visit to **NEWater** visitor center started with a short video, showing the water journey of Singapore and an overview of reclaimed water, followed by an easily-understandable explanation of three steps of NEWater production, and ended up with tasting NEWater. **Rolls-Royces** is a pre-eminent engineering company focused on world-class power and propulsion systems, so it was really lucky to get the chance to visit the plant in Singapore. Mr. Bicky Bhangu, the regional Director of South East Asia and Pacific at Rolls-Royce, gave us an impressive presentation about the history of Rolls-Royce and its advanced technology of engine production. Also, he guided us to have a look at the factory of engine production, and it was surprised to know that the engines, with 18,000 components for each one, are 100% assembled by hand. 5~6 engines can be produced in Rolls-Royce Singapore Plant now, and all are with top-level quality.



**Figure 4 Group photo taken during the dinner before final presentation  
(NTU staff kindly ordered pizza hut for us so that we have more time for preparation)**

Another important activity was group work. My group consisted of 3 Chinese from NTU, Tokyo Tech, and Tsinghua University, an Italian from Europe, a Pakistan from HKUST, and a Korean from KAIST. Some of us are majored in engineering and science, while the others major in management, so the topic we chose for our final presentation was Building Environment and City Management, including three aspects which were green buildings, urban greenery and urban planning. It was a valuable experience to discuss with students from other countries with different background, and the brainstorm among us was really exciting, all kinds of ideas coming out in a very short time. With a very tight schedule, we could only work together at night, which was tiring actually but indeed worthful. We discussed, drew our ideas, made slides, and gave a presentation to VPs and senior staff of ASPIRE League.



A. Proposal of Building Environment and City Management from our group



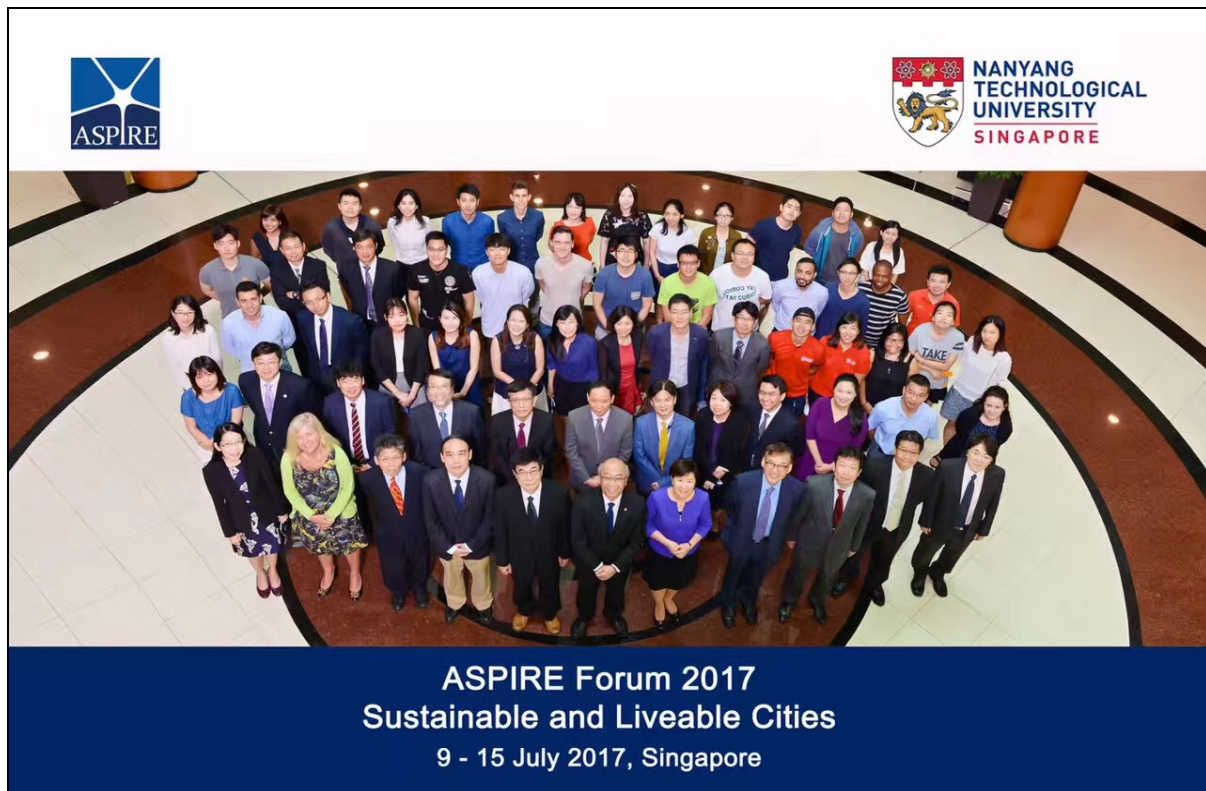
B. Assessment of our proposed idea

**Figure 5 Key contents of the final presentation by our group**

After four and half days' stressful workshop and presentation, NTU organized a half-day city-tour for us, which provided a nice chance to have great fun together! We went to ride **Singapore Flyer**, which is the highest sky wheel in Asia and the second highest in the world. The downtown skyscrapers could be seen while standing on the sky wheel, and I felt surprised that in Singapore, even in the downtown, greenery covers a large area. Then, we were guided to the **Sands Skypark**, an observation deck on the top of a unique building at Marina Bay, from where we could enjoy the view of Singapore panorama, and we had a great time there taking lots of photos with friends. **Gardens by the bay**, including **Flower Dome** and **Cloud Forest**, was really an amazing sight, and I can feel the beauty of nature there even it's located in the city center. I really love the idea of placing natural gardens and skyscrapers so near, so that people can always be reminded to respect the nature and appreciate all beauty gifted by the nature. Our final dinner together was arranged by NTU as well, in a Chinese restaurant. Since most students would leave in the next day, after dinner, several groups of students



went to other places of interest to have more fun together. Some went to see the Merlion and enjoy the night view of Singapore downtown area, and the others went to visit the Night Safari. I was in the latter group, going to visit **Night Safari**, and for the first time I was so close to wild animals in a jungle without cages at night, which also made me feel the complex beauty of the nature and animals.



**Figure 6 Photo of all participants, VPs, senior staff and coordinators**

#### **④ Cost of study abroad**

Tokyo Tech provided 70,000 Yen stipend for participants (who are not MEXT scholarship receivers), which can cover round-trip air tickets (about 48,000 Yen), AIU overseas insurance (4,548 Yen), and visa application (9,700 Yen). NTU arranged accommodation for all participants, which was free. Therefore, participating in the program was almost free. What I paid by myself were transportation fees between the airport and NTU campus, going to the Night Safari, and buying some souvenirs in Singapore. Since it was a short-term program and the host university arranged almost everything for participants, 20,000 Yen was more than enough.



**Figure 7 Accommodation arranged by NTU and the view seen from the dormitory**

## **⑤ Your living arrangements during the study abroad**

NTU provided single room dormitory on campus for all participants, and the dormitory we were living in was named Pioneer Hall, a very new building. Basic furniture like bed, desk, chair and shelf, bedsheet, pillow, and blanket were provided, but personal toiletries (toothbrush/paste/soap/slipper) and power plug adapter should be prepared individually depending on our needs. Internet connection was available but we should bring with us LAN cable, because the Wi-Fi in the dorm was weak. Supporting facilities were complete, with free gym near the dormitory, common bathroom in each floor, and laundry room with washing machines and dryers in each two floors. Since NTU provided a guideline before the program, I followed it and didn't face any problem concerning daily life need.

## **⑥ Language study during the study abroad**

During the program, students were from many countries, and it was in Singapore, so most often used language was English. All lectures and guide for site visits were conducted in English. However, for the communication among students who are from the same country, it depended, so sometimes I also talked with Chinese students in Chinese but rarely.

## **⑦ Personal growth**

I strongly feel that I became more confident while talking with people or doing presentation in English. Before this program, Japan was the only foreign country that I have ever studies in. Even though my English has improved a lot since coming to Japan last September, I still always hesitated to speak out my thinking in English, before joining ASPIRE program. And actually if my senior didn't strongly recommended ASPIRE to me, I might not have applied and got the chance to join it. Luckily, I applies, tried hard to express myself during the interview for screening, and was selected. Being successfully selected as representatives of Tokyo Tech to participate in ASPIRE Forum encouraged me a lot, and I made up my mind to grasp as many chances as I can to improve my English and to do my best in the program. When I had the courage to speak English without too much concern, things became easier than I imagined and I was not as awful as I thought. I can express myself clearly, and I can exchange my ideas with group members smoothly. The final presentation was given to vice presidents of five universities and senior staffs, however, it surprised me that I didn't even feel nervous while I was delivering just in front of them with less than two-meter distance. From now on, I will be more confident to express myself, and more enthusiastic in being involved into international activities.

During this program. I interacted with students from different countries with various backgrounds and different ways of thinking, and the communication with them gave me new points of view on the same topic, which inspired me a lot. In addition, the sense and ability of teamwork, was strengthened by doing group project in this program. Working on a project within such limited time was actually tough, but teamwork made it happening. I really appreciate my group members for working so hard together and giving me so much help.

It was the active interaction among all students that built up strong friendship in such a short period, which I valued so much. The program finished, but our friendship has just started. I would like to keep in touch with all friends I met through this program.

## **⑧ Message**

Never hesitate to participate in international programs. You will never be disappointed by people you would meet and things you would go through. And it's always worth trying and experiencing.

## Report on the Completion of Study Abroad (for short-term program of 3 months or less)

(Report Date                      17/07/20)

Study abroad program name	<b>ASPIRE Forum 2017 Student Workshop</b>
Affiliation at Tokyo Tech	Graduate School of <u>Science and Engineering</u> Dept. of <u>Electrical and Electronic Engineering</u> Year:2
Name	J.M.
Country of study abroad	Singapore
Overseas affiliation	Nanyang Technological University
Period of study	Period in the program:                      17/07/09    to    17/07/15  Period spent overseas:                      17/07/08    to    17/07/15

① **留学先（参加プログラム／受入れ機関）の概略**

**ASPIRE Forum 2017 Student Workshop**

② **留学前の準備**

特になし。ビザ等の申請必要なし。

③ **留学中の活動及び感想**

とても充実していた。7月9日（日）～7月15日（土）までシンガポール・南洋理工大  
学で開催されている ASPIRE League のワークショップに参加してきました。

約 30 名ほどの学生がアジア、ヨーロッパ（数名）から集まっていました。

今回のテーマは、「sustainable and liveable city」でした。

ワークショップでは、主に①講義②工場訪問③グループディスカッション

④プレゼンテーションの活動を朝 9 時から夜 10 時までする流れでした。

④ **留学を終えて、自分自身の成長を実感したエピソード**

世界で活躍する仲間と一週間のディスカッションを通じて、自分に足りないスキル等が  
明確に見えたと同時に、世界で通用するスキルも垣間見えた。

⑤ 留学費用

渡航費：60,000、プログラム参加費：0円

生活費：0円 住居費：0円 保険料：7000円 奨学金 有 70,000円

⑥ 留学先での住居

ワークショップ主催者が手配してくれた

⑦ 留学先での語学状況

留学期間中は英語を使用。

発音等に問題があったと感じた。今後も英語を練習する理由があると感じた。

⑧ 単位認定（互換）

なし

⑨ 留学経験を今後、どのように活かしたいか

世界で活躍する仲間に出会えたことが一番の財産であり、今後も良い関係を続けていきたい。

⑩ 留学先で困ったこと（もしあれば）

なし

⑪ 留学を希望する後輩へアドバイス

おすすめできるワークショップです！ぜひ参加してください！

## 報告書

7月9日（日）～7月15日（土）までシンガポール・南洋理工大学で開催された ASPIRE League のワークショップに参加してきました。

### 1. ASPIRE League スケジュール

	7/9(日)	7/10(月)	7/11(火)	7/12(水)	7/13(木)	7/14(金)	7/15(土)
午前	シンガポ ール 到 着	講義	講義	講義	講義	プレゼン	帰国
午後		工 場 見 学	工 場 見 学	工 場 見 学	ディスカ ッション	シティ ツアー	
夜		ディスカ ッション	ディスカ ッション	ディスカ ッション	ディスカ ッション		

ワークショップでは約 30 名ほどの学生がアジア、ヨーロッパ（数名）から集まっていました。

今回のテーマは、「sustainable and liveable city」です。

ワークショップでは、主に①講義②工場訪問③グループディスカッション、プレゼンテーション

の 3 つの活動を朝 9 時から夜 10 時までする流れとなっていました。

## 2. 滞在中の勉強, 研究等についての感想について

### ① 講義について

今回のワークショップのテーマである「sustainable and liveable city」に関連した講義が用意されていた。具体的には、「Singapore Autonomous Vehicle Initiative and Future Singapore Urban Mobility」, 「Building Water Resilience」, 「Advanced Material toward Energy Sustainability」, 「Road to a Global Hydrohub」等である。その中でとても印象に残った「Road to a Global Hydrohub」について紹介したい。講義では、シンガポールの地理的特徴, 課題, 解決策が説明された。

#### 「地理的特徴」

シンガポールは東南アジア諸国連合 ASEAN のメンバーでマレーシアに接する位置にあります。国土面積, 人口はそれぞれ約 700 km<sup>2</sup> , 560 万人ほどで東京よりも小さい。

#### 「シンガポールが抱える二つの課題」

1つは国土の狭さ, 2つ目は水不足です。

特に水問題は, 国を挙げての最優先課題として取り組みをされており深刻さが伝わりました。

現状として, 供給されるうち 30%の水が隣国マレーシアから, 通常の価格より高い値段で輸入されています。このため, 香港, 東京と比べて水の値段が7倍近く高くなっています。

#### 「解決策」

講義では主に, 2つの解決策が述べられました。1つは新技術の導入です。

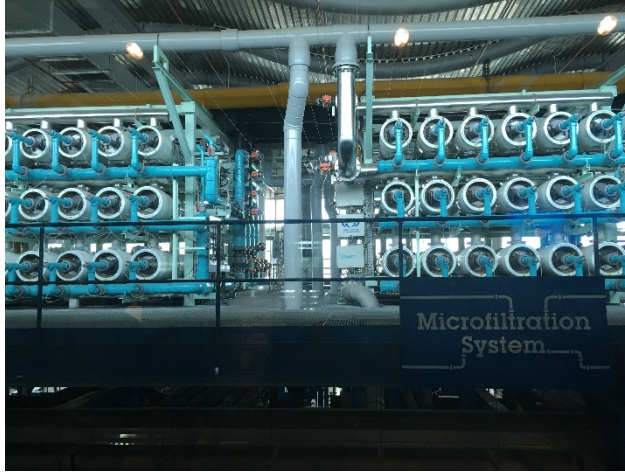
工場訪問を行った水処理施設「NEWater」では, 世界 No1 クオリティと賞賛高い水が作られていた。施設では直径 5nm ほどの新技術多孔質膜を取り入れていた。

2つ目は, 国民への教育です。技術的な革新だけでなく, 国民への倫理的な取り組みも頻繁に行われていた。この結果, シンガポールでは一人当たりの生活用水の 30%削減に成功した。

### ② 工場訪問

工場訪問では, 太陽光パネルを作る「REC Singapore」, シンガポールの水供給 30%を支える水処理施設「NEWater」, 飛行機, 車, 船などのエンジンを製造からメンテナンスを行う「ロールスロイス工場」を回った。





NEWater



Rolls-Royce

③ グループディスカッションでは「シンガポールの水問題」について取り組みました。

シンガポールの水問題は、国を挙げての最優先課題として取り組みをされており深刻さが伝わりました。

現状として、供給されるうち 30%の水が隣国マレーシアから、通常の価格より高い値段で輸入されています。このため、香港、東京と比べて水の値段が7倍近く高くなっています。

この現状を変えるべく、チーム6人団結して課題に取り組みました。

私たちのチームでは、どのようにしたら水の需要量を減らせるかに着目しました。

例えば、生活に使われるトイレの水を削減する工夫、農業で海水を使う工夫、IoT を用い、水パイプラインからもれる水を検出するシステムの提案等です。



### 3.滞在中に行った勉強・研究以外の体験について

#### 【シンガポール観光】

シンガポールで象徴的なマーライオン

カニ@jumbo レストラン



**Report on the Completion of Study Abroad  
(for short-term program of 3 months or less)**

(Report Date 17/07/31)

Study abroad program name	<b>ASPIRE Forum 2017 Student Workshop</b>
Affiliation at Tokyo Tech	School of <u>Environment and Society</u> Dept. of <u>Transdisciplinary Science and Engineering</u> Year: <u>1</u>
Name	D.U.
Country of study abroad	Singapore
Overseas affiliation	Nanyang Technological University
Period of study	Period in the program: 17/07/09 to 17/07/15 Period spent overseas: 17/07/09 to 17/07/15

## ① 留学先大学の概略

留学先: 南洋理工大学 (NTU)

シンガポールにある大学。シンガポール内に 3 つのキャンパスを持ち、今回は西部にある校舎及び学生寮に滞在した。NTU はアジアでベスト 2 の大学として評価されている。

## ② 留学前の準備

留学前には主に次の 2 つの準備をしました。

### 1. 学習面での準備

以前から ASPIRE に興味があり修士となり StudentWorkshop に申し込めるようになって申し込みました。少しでも多くのことを吸収するためにシンガポールについて自分自身で調べました。特にシンガポールは水不足が問題となっており、訪問先の 1 つであった NewWater について知識を得ていたことは有益なことであったと考えます。

### 2. 受け入れの手続き

基本的には国際連携課の方が受け入れ先の大学とコンタクトをとり量の手続きをおこなってくれました。自分は保険への加入・大学までのアクセスの確認等をおこなうのみでした。ただ、グループ参加が決まってからプログラムまでの期間が短く飛行機の予約を迅速におこなう必要がありました。

## ③ 留学中の活動

プログラムの期間は 7/9~15 の 6 日間でした。初日は寮へのチェックインと周辺施設の案内、そしてアイスブレイキングが夕食を兼ねておこなわれました。ここで 6 人のメンバーから構成されるグループが発表されました。夕食後にはいくつかのゲームが企画されていて自然とメンバーとのコミュニケーションがとれました。プログラムが本格的に始まったのは 7/10 からでした。1 日目から 3 日目は午前中に 2 つの講義、午後に学内外の施設での見学をして夜は各自 6 日目のグループワークをおこないました。4 日目は参加校から教授が集まって発表を聞き、午後からプレゼンの仕上げをしました。5 日目は午前中に参加校の副学長の前でチームごとにプレゼンテーションをおこない、午後からシンガポール中心部での観光へ行きました。





写真1 初日のアイスブレイキングにて

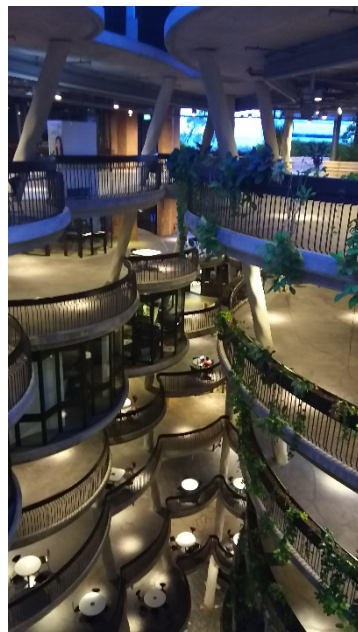


写真2 講義がおこなわれた Hive と呼ばれる建物



写真3 2 日目に訪問した Newater

#### ④ 留学を終えて、自分自身の成長を実感したエピソード

今回のプログラムでは多くの生徒が積極的に質問・発言をしていて、自分も追い付いていこうという思いが強かったです。そういったなかで 1 日目に”Building water resilience for urban environments based on modern ecological approaches”という題名の講義がありました。この講義では微生物を活用した水環境・土壌環境の改善が紹介されていました。自分の専門が微生物を用いた堆肥化であったことから似ている部分が多くあり興味深い内容でした。講義の間には時間が限られていて質問することができませんでしたが、昼食の時間中に質問をできました。最初は講義の内容が正しく理解できているか少し不安でしたが、丁寧に解説をしていただきました。また質問も快く受け入れてもらい自分の研究との関連も見いだすことができました。質問の最後には疑問や困ったことがあれば気軽にメールを送るように言っていただき、自分の学んできたことに自信を持ち更に広い分野への興味を持ちました。

#### ⑤ 留学費用

最終的にはほとんどお金がかかりませんでした。滞在中は食費・滞在費・交通費すべて NTU に賄って頂きました。自分が払ったのは飛行機代や軽食代などですが東工大基金から奨学金を頂いたので、それらもお金がかかりませんでした。

#### ⑥ 留学先での住居

大学の学生寮に滞在していました。出発前は一人または二人部屋ということでしたが、参加者全員が一人部屋となりました。部屋には机・ベッド・エアコンと必要なものは備えられていました。トイレ・シャワーは共用でしたが綺麗に手入れされていてストレスは感じませんでした。スーパーやコンビニも徒歩 10 分ほどのところにあり便利でした。

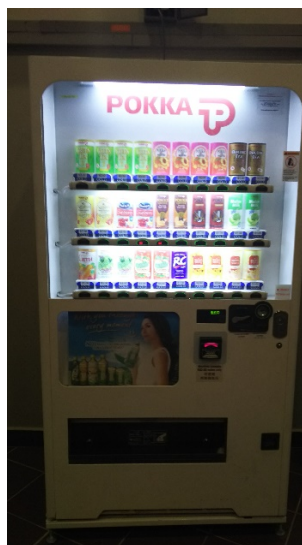


写真4 量の部屋と近くにあった Pokka の自販機

### ⑦ 留学先での語学状況

プログラムはすべて英語でおこなわれました。やはりこのようなプログラムに参加する生徒は英語でのコミュニケーションに慣れている人がほとんどでした。自分自身も普段から研究室で英語を使ってきましたがやはり能力の差を感じました。ただ、毎日メンバーとの会話を重ねていくうちに少しずつ慣れていきました。英語そのものの鵜力も重要ですが、何を話すかがより大切であると強く感じました。これからはもっと海外の言葉・文化にレーダーを張って次の機会に生かしていきたいと考えています。

### ⑧ 単位認定、在学期間

1 週間の超短期プログラムだったので学科での単位申請はおこなえませんでした。

### ⑨ 留学先で困ったこと(もしあれば)

NTU の設備・支援スタッフから手厚い支援を得て基本的には困ることはありませんでした。自分はシンガポールに初めての滞在で、規格の異なる変換プラグを持って行ってしまいましたがすぐに学内のスーパーで購入することができました。一方でグループメンバーの韓国出身の学生は蚊に食われてしまったようで事前の準備を忘れてはいけないと再確認しました。

### ⑩ 留学を希望する後輩へアドバイス

ASPIRE student workshop は短期間に多くの学びと出会いを経験できる素晴らしいプログラムです。レクチャーにはテーマに沿った様々な分野の講義を受けることができ、他分野への興味が広がります。学外施設への訪問ではその国の特徴を反映した施設に行くことができ、その働き方に触れることができます。そして、グループワークでは院生が対象ということもあり各々の得意分野を繋げながらアイデアを出し合う経験ができます。そのような貴重な経験をホスト校と東工大の支援により最低限の支出で参加できるのは幸運なことです。希望の年度に自分の専門や興味がテーマにあったものであれば参加することをオススメします。



写真5 最終プレゼン終了後の集合写真

**Report on the Completion of Study Abroad  
(for short-term program of 3 months or less)**

(Report Date : 2017. August. 07<sup>th</sup> )

Study abroad program name	<b>ASPIRE Forum 2017 Student Workshop</b>
Affiliation at Tokyo Tech	School of <u>Engineering</u> Dept. of <u>Industrial Engineering and Economics</u> Year: <u>D1</u>
Name	L.C.
Country of study abroad	Singapore
Overseas affiliation	Nanyang Technological University, Singapore
Period of study	Period in the program: 2017 07 10 to 2017 07 14 Period spent overseas: 2017 07 10 to 2017 07 15

# Completion Report

## (1) Aspire league & forum

Asian Science and Technology Pioneering Institutes of Research and Education (ASPIRE league in short) is the academic consortium between 5 technology leading universities in Asia: Tokyo Institute of Technology in Japan (Tokyo Tech in short), Korea Advanced Institute of Science and Technology in South Korea (KAIST in short), Tsinghua University in China, HongKong University of Science and Technology in Hongkong (HKUST in short) and Nanyang Technological University in Singapore (NTU in short).



Figure 1. Aspire league and its members

The league contains variety of research collaborations and regular activities together. Aspire forum: student workshop is one of those program, which comprised of lectures, sites visits based on particular theme set by the host university. In this year, NTU, as host university, set “Sustainable and Liveable cities” as the theme of the forum in this year. Around 30 students from each universities of ASPIRE league and IDEA league (European technological universities consortium) gathered in NTU to learn, collaborate to propose novel idea for the theme for around a week.

## (2) Motivation

As doctoral student doing research about smart city, the theme seemed very attractive. With high expectation to see and experience about how well the Singapore, as one of the leading smart city in the world, have achieved various innovations in their city, I decided to apply the event. Also, to meet and experience to collaborate with the various students in diverse background was the other motivation.

## (3) Before departure

There was official announcement from the international office about application for ASPIRE 2017



forum. After document screening, I could have test interview by professors and relevant staffs of the program. In my case, thanks the kind consideration of the international office, I could have remote video interview, since I was studying in Ireland for my research internship in that period.

After the being selected, there are certain numbers of administrative processes for making study abroad. In this year, students could receive some financial support for the travel expenses with fixed amount of funding. In my case, I used my own research budget from leading program (ACEEES) on travel expenses, as I had following academic trip after the forum, near Singapore (research presentation in the academic conference). All other expenses were supported by the host university (NTU): for instance, they thankfully provided local transportations, dormitory and all meals during the forum with warm hospitality (So there was almost no individual expenses).



**Figure 2. Host university: Nanyang Technological University**

There was no required visa for me, as there is agreement between South Korea and Singapore that allows travelers enter the countries without visa. I also applied travel insurance, since all Tokyo Tech students, who are going abroad, are asked to apply the travel insurance, that meets criterion suggested by Tokyo Tech.

#### **(4) Stories in Aspire 2017 forum**

##### **4.1 First day: Arrival to NTU**

Different to other Tokyo Tech students, I could arrive to the venue in later time, since there was other academic forum in Nagano before the trip, thus, that was the only choice. After completing contact and proper coordination with the officer of Tokyo Tech, tutor and officer of NTU, I could arrive very early in the morning (around 5am) of workshop day. I used “Uber” service from the airport to the venue in NTU (In Singapore, Uber is very reasonable and comfortable transportation method); I could have instruction about the dormitory (1 private room for each participant, located in NTU) and events by tutor and NTU officer before starting the workshop.

##### **4.2 In first 3 days of forum**

For 3 days, students could have lectures related to “Sustainable and Liveable cities” in the morning. Some of lectures were in abstract, holistic and policy style about city plans. The others were very technology specific, such as Autonomous vehicles or water and nature treatments technologies. It was very impressive that most students in the forum were very much active in making discussion during or after the lectures. Some lecturers even had to make more than 1 hour delay due to students’ continuous questions and comments.

In the afternoon, students visited infrastructure or industrial sites related to the theme “Sustainable and

Liveable cities”. For instance, we could visit and see REC Singapore (Solar power generation panel manufacturer), NEWater (Singapore national water purification infrastructure for recycling) and Rolls-Royce plants (Engine manufacturer). Most students received big impression on how industries are keenly innovating themselves to get the competitive edge in the market and the society. I think it was very meaningful time to extend our view and insights from theory to practice.



**Figure 3. Group collaboration**

In the evening, we usually had group collaboration time for making the proposal for the last day presentation. (The group was decided in the first day, mixed by students from all universities in balance). It was very tough and intense time for all students, since they all became exhausted from the tight schedule of lecture-taking and site-visiting during the days. However, all of students were very responsible and active for collaborating even in such hard situation (Some of them keep hardworking even they were sick). It was difficult to make effective collaboration at first because of different styles of communication, work as well as different background knowledge at first time. But students calmly tried to find best way to work together. And I believe that was really great opportunity for every student to learn how to work with different people in this global society.

#### **4.3 Singapore style meal and Tea Break**

In the forum, NTU provided warm and the greatest hospitality to the students. Different kinds and style of meal were served into lecture place in every morning and lunch time. And in every evening time, NTU brought participants to the popular restaurants in NTU or Singapore. All students were so surprised on the taste and quality of the food, but particularly “quantity of food”.

All students may agree that one of the most interesting and joyful thing in the forum is “tea-time”. There was big big breakfast in every 9am: Tea break was made in 10.30am: Lunch was served in 12:00pm. There were only 1.5 hour intervals between breakfast, tea-break and lunch, which is very short. However, NTU decided to give us too great tea-break to the students. In tea-break, very big quantity of heavy foods (i.e. fried Gyoza, chicken bread, etc.) were served with the tea and coffee. And almost no students could easily finish that big quantity of so-called dessert during the tea-break.

Therefore, students started making a joke together continuously, “Shall we have some tea-break?” in sarcastic way. And every people could have fun with this joke, which only ASPIRE 2017 forum can understand. I think this joke was one of the best ice-breaker as well as good memory for everybody in the forum. Me and some participants are still continuing conversations with this joke.

#### 4.4 Last day: Presentation

Based on 3-days-collaboration, all teams were asked to provide presentation about their proposal. Vice presidents and professors from each university joined the event to make fruitful discussions and evaluation. Many interesting proposals were made related to theme “Sustainable and Liveable cities”. And my team proposed ASPIRE framework for assessing capability of water treatment and management in the city level for its sustainability. Therefore, the topic of my team was more in policy and management perspective, while other teams were focusing on applications of technology.



Figure 4. Group Proposal: Aspire framework

Since topics of most teams were novel, I think the key factors of the evaluation were pitching style and interaction with audiences, and consiliences of technology and other studies. Based on my observation, the specialty of the winning team was spontaneous scenario play that helps audiences be immersed in targeting issues and problems of the team. And individual winner could give great impression to the audiences by explaining linkage between phenomenon of present, future and technology in philosophical view, which is not commonly discussed in technological schools.

All presentations were interesting and impressive. And I could learn many applicable aspects of technology as well as team-work, pitching style of presentation. One thing to be desired was that there were not enough time for this team-working. I believe students could make more novel-creative and even feasible-logical proposals if they could have more time and redundancies.



Figure 5. Final Presentation

## 4.5 Tour

After the last presentation, NTU offered city tour to the all participants. We could visit most popular travelers' attractions in Singapore, such as Marina Bay Sand, Gardens by the bay, Singapore flyer, etc. Every student could enjoy the time without any pressure. I felt this was the most meaningful time for networking and relaxing (Me and all participants wished to have the time like this to be longer...).



**Figure 6. City Tour in the last day**

### **(5) After the forum**

I am feeling lucky that I could have this kind of opportunity, thanks to my school. I could learn many knowledge and experiences about Sustainable and Liveable city, which is crucially related to my doctoral research topic “Smart City”. After all lectures, I tried to actively exchange contact with the lecturers and researchers in Singapore. And I am keeping conversation with them how to initiate collaborative research about the smart city. For instance, one of researchers from the institute (of one lecturer) is going to visit Japan for her presentation, and they suggested to have some casual research talk to exchange some ideas. And I could use Singapore as benchmark-able best cases when discussing smart city strategy of Tokyo in my research.

Network is another valuable thing that I could receive during the forum. All members are still keeping contacting each other through the social media messengers. I believe there would be someday that me and other members can meet or work together.

### **(6) To the potential applicants to ASPIRE forum**

I would like to strongly recommend you to apply this program! This is the exact opportunity that you can learn how to work with people from diverse background in certain settings, which all the organizations and countries are looking for, in this global society. Also, this is not only the chance to meet nice friends in various countries and schools, but also the chance to have meaningful visits and tours in other country.

### **(7) Image sources**

<http://www.aspireleague.org/>

<http://www.ntu.edu.sg/>

**Report on the Completion of Study Abroad  
(for short-term program of 3 months or less)**

(Report Date : 2017. August. 07<sup>th</sup> )

Study abroad program name	<b>ASPIRE Forum 2017 Student Workshop</b>
Affiliation at Tokyo Tech	Interdisciplinary Graduate School of <u>Science and Engineering</u> Dept. of <u>Electronics and Applied Physics</u> Year: <u>D2</u>
Name	T.O.
Country of study abroad	Singapore
Overseas affiliation	Nanyang Technological University, Singapore
Period of study	Period in the program: 2017 07 9 to 2017 07 14 Period spent overseas: 2017 07 9 to 2017 07 15



## 1. 派遣概要

本派遣は、ASPIRE リーグにおいて、毎年 7 月に格好の副学長が集い、各校の過去 1 年の活動や国際交流、共同研究の状況等を発表する ASPIRE フォーラムを開催しており、並列して実施される 1 つのプログラム「ASPIRE Forum Student Workshop」に応募したことから実現した。

### 【ASPIRE Forum Student Workshop とは】

大学院生を対象とした学生交流プログラムであり、開催校により決められたテーマに沿った講義や見学が盛り込まれた約 1 週間のプログラムである。参加者は ASPIRE リーグだけではなく、IDEA リーグの学生との交流やグループ活動を通じて、最新の研究に関する知識を習得し、国際理解を深める。

### 【応募条件（2017 年度）】

- 東京工業大学所属の大学院生
- 英語で議論ができること
- アジア理工系大学トップ 5 大学の学生交流に熱意があること
- テーマに関連した研究活動を行っていること
  - 2017 年度テーマ Sustainable and Liveable Cities
  - 参考分野 : Renewable energy, Urban Mobility, Environment and Safety, Green Buildings, Waste to Energy, Water, Land and Livability, Green Data Centers

### 【選考スケジュール（2017 年度）】

募集期間 :                ~5/17  
面接 :                      5/22  
可否発表 :                5/25

### 【滞在期間・場所（2017 年度）】

（期間）2017 年 7 月 9 日（日）～7 月 14 日（金）（滞在は 15 日（土）朝まで）  
（滞在場所）Nanyang Technological University, Dormitory

### 【渡航にあたる補助（2017 年度）】

- 東工大基金より 7 万円の渡航資金補助



## 2. プログラム内容

ASPIRE Forum Student Workshop での主なプログラムについて簡単に紹介する。

### 【Ice break session】

到着直後、様々なゲームや食事で主にグループ毎に親睦を深めた。



図：Ice break session での集合写真

### 【Lectures and discussions, Symposium】

“Sustainable and Liveable Cities”を中心テーマに、様々なポジションの方々のレクチャーを受け、ディスカッションをした。以下に、Workshop におけるレクチャーと、Symposium におけるレクチャーを示す。

#### <Workshop Lectures> 10 – 12 July 2017

- Singapore Autonomous Vehicle Initiative (SAVI) and Future Singapore Urban Mobility
- Building Water Resilience for Urban Environments Based on Modern Ecological Approaches
- Building Sustainable and Liveable Cities
- Advanced Materials Toward Energy Sustainability Solutions
- Liveable and Sustainable Cities
- Singapore's Water Journey: Road to a Global Hydro-hub

#### <Symposium Lectures> 13 July 2017

- "GeGe" – Geo Energy and Geo Environment
- A Role of Soft Materials for Sustainable Cities
- Less than 2 degrees C at 1 degree North: Paris Agreement and Singapore – Challenges and Opportunities
- Green Supercomputer TSUBAME and Large-scale Applications on Computational Fluid Dynamics
- China Water Resources and Sustainable Management under the Changing Environments
- Functional Design of Protein Cage for Sustainable Bionanomaterial

## 【Site visit】

“Sustainable and Liveable Cities”に関わりのある様々な企業・組織を訪れた。以下に訪問した企業・組織を示す。

- REC Singapore
- NEWater
- Royce-Rolls Plant



図：REC Singapore での集合写真

## 【Group work】

1 チーム 6 名程度で、1 つのトピックに対して、最終日のプレゼンテーションに向けて議論・調査・発表準備を行った。なお、Group work に充てられている時間はごく僅かなので、すべてのプログラムが終了した夜に準備をすることが多かった。



図：Group work の様子と私の Group member (Team Gray)



### 【Final presentation】

ASPIRE リーグ 5 大学の副学長の前で、Group work の成果を発表するプレゼンテーションを実施した。プレゼン時間は 20 分であった。私のグループは、「Green Energy」を題材に、Nanyang Technological University の学生が抱える問題のソリューションを、エネルギーに関してミクロ・マクロを合わせた視点で発表した。



図：最終プレゼンの様子／「Best Group Presentation Award」受賞後、メンバーとともに

### 【Sightseeing】

最終プレゼンテーション終了後、シンガポールの有名スポットを回った。



図：Gardens by the bay／Marina bay sands にて各国の学生とともに

### 3. 所感

ASPIRE リーグ、IDEA リーグの 9 大学から 30 名の大学院生が集う ASPIRE Forum Student Workshop に参加した。非常に短期間ではあったが、日常の喧騒を離れ、終始笑いが絶えず、学びも多くある 1 週間だった。本派遣を実現してくださった関係者の皆様へ心から感謝を申し上げたい。感謝の意を込めて、以下に、参加動機および、シンガポールでの 1 週間で感じたこと・得たことについて述べる。

#### 研究への関わりと学び

本ワークショップのテーマである“Sustainable and Liveable Cities”は、私の複数の研究テーマと密接に関わっていると感じた。私は現在、2 次元半導体材料を次世代の Human Interface Device 開発に向けて研究している。以前の私であれば、“Sustainable and Liveable Cities”というテーマの技術的側面にのみ着目していたかもしれない。しかしながら、昨年からデュアルディグリープログラムを利用し、所属し始めた技術経営専門職学位課程での学びを経て、このテーマは、技術単体の問題ではなく、多くの関係者を能動的に巻き込み、それぞれの「技術」のみならず「意見」をも調和させるコミュニティをどのようにデザインするかが重要だと現時点では感じている。

本ワークショップでは、様々な専門を持った学生が各国から集まり、1 つのテーマについて議論するという素晴らしい機会がある。そのような機会を利用し、多様な専門性を持った人々と協働するコミュニティとはどういうことなのかについて体験したく、本ワークショップに応募した。

実際に参加して感心したのは、シンガポールの全体最適化を図る政策や、様々な能動的なアクターにより構成されるエコシステムが構築されていることだ。国土が小さくリソースも限られているからこそ、全体まで意識が行き届いているという側面はあり、そのまま各国に適用できるモデルとはならないかもしれないが、シンガポールには、様々なアクターが 1 つの場所に集まり、議論し、方向性を決めるプラットフォームがあるように感じた。また、それらが計画的に実行されているように感じ、様々な技術や意見を調和させるコミュニティの在り方について、少しだけ肌で感じる事ができた。

#### 各国の大学生と交流／世界で働くということ

もう 1 つの目的は、アジアのトップ大学の学生と交流を通して、自らの視野を広げ、かつ、将来に生きる関係を構築することであった。

実際に参加して最初に感じたのは、協働の難しさであった。これまでに、第二言語である英語を用いて（かつ、グループメンバーのほとんども第二言語）、抽象的なトピックについて深堀し、それを 1 つにまとめ上げる作業をした経験がほとんどなかったため、最初は難しく、宙に浮いた議論が多くなった。そこで私は、議論を可視化することに焦点を当て、議事録を作成したり、ホワイトボードを多用したりするなど工夫し、全員の認識をそろえることに着目した。その甲斐があったのか、メンバーの能力によるものか今となっては分からないが（おそらく後者だろう）、徐々に議論がまとまるようになった。他方で、議論することだけが目的ではないので、チームの雰囲気作りも大切にしたい。他のチームの学生から“you guys are laughing all the time”と言われたのはとても印象的だった。議論が脱線し、ジョークを永遠に飛ばし合い、その結果、最終プレゼン準備は他のチームと比べ一番遅くまで時間がかかってしまった（終了したのは発表当日 2:00am）。内容的には、それぞれの学生の強み（研究分野など）が調和した内容となり、形的ではあるが、NTU の学生との共同研究提案をするまで、お互いの強みを深堀することができた。プレゼンではチームメンバーにも恵まれ、Best Group Presentation Award を受賞することができた。プレゼンに skit を取り入れるなど、ユーモアを交えながらプレゼンできたことは、チームを象徴しているようだし、そのようなチームを、短期間で様々なバックグラウンドを持つメンバーとともに作り上げることができたのは、世界を舞台に働くということに対して、少なからず自信にもつながった経験であった。

## 最後に

非常に良い雰囲気の中、学びも楽しみも多い、素晴らしい1週間を過ごすことができた。また、多様なバックグラウンドを持つ学生との繋がりや、世界を舞台に働く自信を持ち帰ることができた。このような素晴らしい機会を頂けたことに感謝し、また今回感じたことを活かしながら目標に向けて一步一步積み上げて行きたい。



図：最終プレゼン終了後、参加学生全員で