2016年度グリーンアジア国際セミナー 学生セッション 報告

Group 1 ……Topic 1

Leader : Yuki Uchida
Supporter : Choi Cheolyong , Zayda Faizah Zahara

Shinichiro Kojima , Kim Sung Jin ,
Ibrahim Mohamed Abdelhak Maamoun ,
Choi Cheolyong , Yuki Uchida ,
Hong Bingzhou , Sampad Ghosh ,
Zayda Faizah Zahara , Hiroshi Akamine

Choi Cheolyong

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During the student session in Green Asia forum, my group discussed about fusion energy, from its definition to fate. Fusion is a way of power generation using deuterium and tritium that are abundant in the ocean. It is highly potential as a future energy source due to environmentally friendliness and huge energy generation. One of the most notable advantages of fusion energy is little amount of radioactive waste as a by-product regarding the fact that radioactive waste is the reason to make nuclear (fission) energy controversial. On the other hand, it requires extremely high energy and temperature to overcome electrostatic repulsion of protons, which leads to expensive operational cost. Though fusion releases energy theoretically three times or even greater (up to 7.4 times) than fission, the cost impedes commercialization of fusion power plant. There have been broad studies on the fusion energy; for instance, International Thermonuclear Experimental Reactor (ITER, collaborative work of 35 countries) project has been in progress since 1985. However, realization of power generation from fusion energy is still uncertain. In this regard, my group had discussed about feasibility and whether or not financial investment should be carried on.

Due to the wide range of discussion in limited time, we divided members into four sub-groups, two members each. From viewpoints of theory, potentiality, security, and feasibility of fusion energy, we derived a common conclusion.
First of all, deuterium and tritium fuse at 150 million degree Celsius and produce helium and neutron which are not radioactive. Second of all, Energy release is equivalent to 1.4×108 cal calculated by Einstein's equation, E=mc2. Compared to the energy from fission, 1.9×107 cal, it reaches 7.4 times higher energy. Third, deuterium and tritium, resources of fusion energy, can be easily provided from ocean due to its abundance. Based on these aspects, we tried to conclude if it is realizable, but we found that more information should be considered.

We paid attention to progress and outcome of ITER project since it was launched. Though the ITER is still under experimental research, it is expected to go on to operate a demonstrative reactor within 10 years. It seems some technical obstacles still exist, e.g. generating extremely high temperature plasma sustained by internal heating, but alternative ways are proposed for proof of concept of fusion power generation. Demonstration can be in progress in parallel with technical advancement. Compared to initial stage of ITER project, significant improvement has been achieved by worldwide contributions. In addition, from viewpoint of explosive increase of energy demand and environmental responsibility of human being, it was concluded that fusion energy is feasible and should be invested to accomplish commercialization.

Zayda Faizah Zahara

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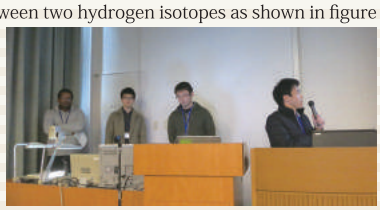
Energy derived from the nuclear fusion, or so called as fusion energy has been developed by several countries in the world. The research in this field had already begun in the early 1920s, however, recently it had just become hot research topic. The leading research groups on this field are gathered in one big organization named ITER. Thousands of engineers and scientists have contributed to the design of ITER since the idea for an international joint experiment in fusion was first launched in 1985. The ITER Members—China, the European Union, India, Japan, Korea, Russia and the United States—are now engaged in a 35-year collaboration to build and operate the ITER experimental device, and together bring fusion to the point where a demonstration fusion reactor can be designed. In this report, the explanation of fusion energy, its advantage, and its economical and practical feasibility will be briefly discussed based on the discussion of our group on the Green Asia forum.

Fusion energy comes from the fusion of light atoms like hydrogen at extremely high temperature and pressure. This reaction is likely occur on the star and sun. At the high temperatures experienced in the sun any gas becomes plasma, the fourth state of matter (solid, liquid and gas being the other three). In order to replicate this process on earth, gases need to be heated to extremely high temperatures of about 150 million°C whereby atoms become completely ionised. The fusion reaction that is easiest to accomplish is the reaction between two hydrogen isotopes as shown in figure 1: deuterium, extracted from water and tritium, produced during the fusion reaction through contact with lithium. When deuterium and tritium nuclei fuse, they form a helium nucleus, a neutron and a lot of energy.



Group 2 ……Topic 2

Leader : Omar Mohamed Ali Mohamed Ibrahim
Supporter : Azizah Intan Pangesty , Yuki Furutani

Kazuki Kuga , Khan Md Rauf Ul Karim , Niko Dian Pahlevi ,
Yuki Furutani , Azizah Intan Pangesty ,
Hatem Omar Amin Mostafa Elserafy ,
Omar Mohamed Ali Mohamed Ibrahim ,
Rezkia Dewi Andajani , Hiroki Gima

Azizah Intan Pangesty

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In this 2016 GA forum, the D2 students were in charge to handle the events. We are also required to present our research result at poster session. In this occasion, I present my result entitled "the behavior of co-culture cell sheet on porous tubular polymer scaffold for blood vessel tissue engineering". I was quite impressed with enthusiasm of some other students who asked me some good questions during the session.

After poster session, we then moved to student session. In this session D2 student were in charge as supporter whose role was to keep discussion keep on track. I was assigned in group 2 in which we discussed about electronic-waste (E-Waste) management system. The term of e-waste is related with all items of electrical and electronic equipment and its part that have been discarded by its owner without the intent of re-use. The fast growing technology is always associated with high consumption of electronic appliances or gadget. When peoples consume more, they tend to discard more. In 2014, the global e-waste volumes had reached to 41.8 million tons which is estimated worth for 52 billion USD.

E-waste is categorized into three types:
•Small appliances, such as microwave, vacuum cleaner and toaster
•Large appliances, such as washing machine and dryer
•Temperature exchanger, such as refrigerator, heater and air conditioner.
•Screens
•Lamps

Since it contains hazardous chemical or metal, the management of e-waste is different with other normal garbage disposal system. E-waste that contains different kind of metal, the separation should be done in order to recover valuable metal. Recovering process of valuable metal using bacteria has been widely used in many countries. Other e-waste which contain only one type of metal are then bring to incinerator to make into steel again.

However, every country has different regulation on e-waste management. 167 countries of United Nations (excluding Afghanistan, Haiti and US) have regulated "no trans boundary movement of hazardous waste". European Countries took initiation to adopt reuse/recycle regulation and urge manufacturer to take back and recycle their products. In Japan, ministry of environment issued home appliance recycling law which means that manufacturer could take back and recycle end-use product.

In conclusion, for the sake of sustainable development, the three concept of reduce-reuse and recycle should be applied in every countries. Reduce means that we will buy new electronics if we need it, not because we want it. Further, once we buy it we need to take a good maintenance of it. The unnecessary appliances that we have yet still well-functioning can be donated to other or sell to second hand shop (re-use). However, the items that cannot be repaired, we need to find an organization that manage this electronics or send back to the manufacturer.

Yuki Furutani 総合理工学府 量子プロセス理工学 一貫制博士4年（博士2年）

I was so impressed the lecture by Kenji Kato. His presentation entitles "Leading Edge of Coal Utilization Technologies". He talked about the lastest coal utilization technologies, such as Carbonization (Cokemaking) and Gasification.

New cokemaking technology SCOPE21 has been attracted. In this technology, low grade coals are blended with coal charge without deteriorating coke strength. SCOPE21 process mainly consists of three units. First is coal rapid preheating unit, second is coal carbonizing unit and third is coke quenching unit. The aim to divide the whole cokemaking process into three parts is to make full use of the function of each process to maximize the total process efficiency. The quality of coke can be improved by upgrading the coking quality of coals. Rapid preheating can improve properties of coal, increasing its bulk density in coke oven chamber. These improvements raise the blending ratio of coking coal up to 50 %, while it is only 20 % in the conventional process.

New coal gasification process using efficient two stage entrained gasifier (ECORPO) was developed by Nippon Steel & Sumkin Engineering Co., Ltd. ECOPRO has the two-stage type gasifier. Firstly, pulverized fine coal is introduced into lower part, and the partial oxidation reaction by oxygen is occurred. The main components of generated gas are CO and H2 etc. Then the generated gas is introduced into upper part of gasifier. Coal pyrolysis reaction occurs by reacting high temperature gas and coal introduced into upper part of gasifier. Thermal efficiency of ECOPRO process is higher than other gasification processes due to two-stage gasification reaction.

During the poster section, I was so impressed the presentation by Cheolyong Choi. His presentation title is "Identification of Molecular Composition of Nascent Tar from Rapid Coal Pyrolysis". His study aims at development of an analytical pyrolysis to identify and quantify aromatic compounds in the tar from rapid coal pyrolysis as much as possible, and then simulate the vapor-phase reactions by a type of DCKM. This abstract reports results of the development of the analytical pyrolysis. He successfully developed the two-stage tubular reactor for the identification.

Additionally, I felt admiration for the poster presentation by Zayda Faizah Zahara. Her presentation entitled "CO2 Gasification of Six Types of Char from Indonesian Sugarcane Bagasse". She performed the kinetic analysis of CO2 gasification of char. She proposed new kinetic model to describe the time-dependent changes in the mass-based char conversion over its range up to 99.99% or even higher by assuming distributed initial activity and deactivation kinetics of the inherent catalytic species.

This GA forum is very useful for me to further my professional study.

Group 3 ····· Topic 3

Leader : Satoshi Takeichi
Supporter : Pennapa Tungjiratthitikan , Ryota Yoneda

Kazuki Sawayama ,
Mahmoud Mohamed Mahmoud Nasef ,
Ryota Yoneda , Pennapa Tungjiratthitikan ,
Satoshi Takeichi , Rezwan Ahmed , Wei-Chen Wen ,
Takanori Hanada

Pennapa Tungjiratthitikan 総合理工学府 物質理工学 一貫制博士4年（博士2年）

1. What is apps economy?

Apps economy refers to the range of economic activity surrounding mobile software applications. It is an ecosystem of enterprises, governments and citizens that use the mobile applications to drive the economy as a whole. This gave way to the creation of new fortunes for developers and entrepreneurs and changed the way business is done around the world. The app economy includes the sale of apps, ad revenue or public relations generated by free apps, and the hardware devices such as smartphones and tablets on which apps are designed to run and provide a new consumer experience.

2. The mobile apps in global scale

The apps economy depends on the area of internet access and their government controlling role. If the economic policy of the country is possible to introduce the digital information and communications technology (ICT) for social and economic reforms in all sectors of the country. With an emphasis on private sector-driven. But the state has a duty to accommodate. Whether by law, regulation, policy or practices. Along with the state to reform the process and use of the information the government has. To provide their services most effectively.

3. The apps economy growth and its effect on the global economy

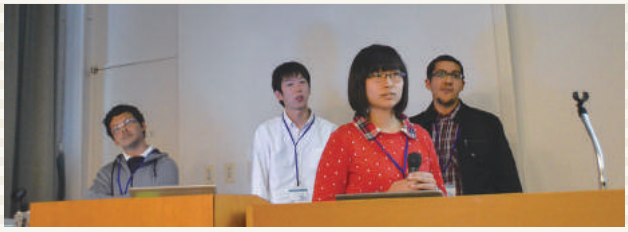
To make the economy growth by applications creating, it needs to be evolved in tandem with other economic sector, and the ecological systems of the society are an important factor to drive the application expansion such as a policy application development. The public politician needs to create an atmosphere of cooperation and competition (Co-petition) to build an infrastructure which perform as a connecting technology to contribute the better life for all population equality especially, poor farmers and local innovators.

Economic applications require the upgrading of technology, for examples improving the messaging (Text-based communication) for more advanced of broadband technology through the cheap smart phones or tablets devices in the near future. If the economic could reach all society sectors; mainly for social entrepreneur, the apps economy will becomes an important key to drive the global economic growth mechanism.

4. The mobile apps affected by society

The highest download in global ranking are the Facebook and Google Earth application, respectively (daily life application), and the apps which providing revenue is games. On average, more than half of people use smart phones are download games in average nine games per person, but the new trending application is about health and business applications on businesses apart from the daily life applications.

Nowadays, the popular and daily life applications keep in the high rank in the global market which makes the difficulty for the new developing application makers to compete in the market. Therefore, the brand or business creators have to study about the society trends and create the applications which supporting for their need. This could make more opportunity for developer to engage with their customers and easier to enter through the application market.



Ryota Yoneda　総合理工学府 物質理工学 一貫制博士4年（博士2年）

INVITED LECTURE

The first speaker, Dr. Hanada from QST talked about current issues on fusion research and technology. His talk included not only technical development toward fusion energy but also international cooperation from the viewpoint of his experience. Since my research involves fusion plasma physics, the talk was highly interesting and meaningful for my study. In a brief summary, ITER (International Thermonuclear Experiment Reactor) project and JT60-SA as BA (Broader Approach) activities were shown and discussed. ITER is an experiment to prove fusion reaction is possible and it's now under construction in France. That means a demonstration of fusion power plant is not included in ITER. A project on practical application of fusion power is also ongoing. As for BA activities, they are governed by Japan and EU to support and complement ITER and demonstration reactor of power generation. Many experiments and computational simulations are planned. In the presentation, JT60-SA and its progress were mainly discussed. JT60-SA will start its operation before ITER initiation. Its main purpose is to obtain data that ITER facility hardly can get regarding safety, reliability and economy of future demonstration reactor. Topics such as fusion energy are often closed to the society even if it is a key issue that might determine future civilization. The lecture gave students and researchers from other fields a good opportunity to learn the progress of fusion energy and current difficulties.

POSTER PRESENTATION

In the presentation session, my theme was 'Particle-loss Control of RF-induced Breakdown in Tokamak Magnetic Structure on QUEST'. Basically it shows my research in general sense that how to start an operation of tokamak plasma reactor for fusion. Since I was the only one at the session who talked about fusion technology, I tried to speak putting an emphasis on why we are pursuing fusion energy as an ultimate solution of energy crisis. The response from the audience was positive against fusion and I could discuss with GA students and faculty members from different fields. Also other presentations were comprehensive in the sense that every student had tried to summarize and generalize their topics.

DISCUSSION SESSION

The topic of our team was 'how to facilitate the apps market'. Before the discussion we separately prepared for the presentation slides. I joined the discussion as an adviser, keeping is right in the track. Most students joined and speak out their opinions. Even though the topic was somewhat abstract, we could make it clear what we should do to promote in the enlarging market of apps. Overall impression on summary presentation at the hall was that every group discussed the topic based on data they found and it was good even though we had a limited time.

Group 4 ……Topic 4

Leader : Shin Sakiyama
Supporter : Marzia Khanam , Tomoaki Hirakawa

Aditya Wibawa , Ali Mohamed Ali Ebrahim Abdelgawad ,
Tomoaki Hirakawa , Marzia Khanam ,
Shin Sakiyama , Konadu Kojo Twum ,
M L Palash , John James Duckworth ,
Tsuyoshi Sato

Marzia Khanam　総合理工学府 環境エネルギー工学 一貫制博士4年（博士2年）

Discussion Summary: In International Forum for Green Asia 2016, I was part of group 4 and our discussion topic was related to energy resources. At first, we discussed different types of energy resources which are divided into two groups- renewable and non-renewable energy. There are various types of non-renewable energies such as fossil fuel oil, coal, natural gas and nuclear. Renewable energies are also different types like solar, biomass, wind, hydropower, geothermal energy. In our discussion, we also classified the energy resources according to cost, CO_2 emission, safety as well as environmental issues. For example, solar and wind have high installation cost but environment friendly. Hydropower needs good location but cost is low. Nuclear has safety problems while cost is also reasonable. On the other hand, fossil fuels have low cost but have environmental concerns. Thus, renewable energy installation cost is high but environmental responsive as well as sustainable while non- renewable energy's cost is low but have environmental concerns. If we look at the current situation of the energy globally, it is clearly visible that fossil fuels are still dominant in energy consumption. Though Renewable energy has many advantages, however, consumption is only 15%. In our discussion, the effect of reduction of oil prices has been also discussed. Oil price reduction has both benefit and drawbacks. As an advantage of oil price reduction, we mentioned that shipping costs of ships, airplanes, etc. will be reduced. Besides, production of petroleum science products will be at low cost and most importantly, thermal power generation cost will be cheap. On the other hand, CO_2 emissions will be increased due to the acceleration of thermal power generation. Regarding potential energy resources to lead the future energy sectors, we tried to focus three Asian countries Japan, Nepal and China as energy situation depends largely on countries. Japan is trying to go towards renewable energy in near future, therefore, they have already set targeted goals. Nepal has huge potential in hydro energy production approximately 43,000 MW though the current production from hydro is 760 MW which is only 2% of their potential hydro energy. Therefore, to meet the future energy demand, they can use hydro energy. There are some constrains in establishment of hydro power plant in Nepal which need to solve such as difficulties in implementation of grid system as well as power plants and poor economic condition. In 2014, China invested more money in renewable energies than either fossil fuels or nuclear for the first time. Total energy from fossil fuels fell by 0.7%, whereas that generated by renewables grew 19%.Huge amount of renewable potential are in China, therefore, renewable energy is growing rapidly.

References:

•www.wikipedia.com
•China Electricity Council 2014.
•Kansai Electricity 2016.
•Ministry of Economy trade and industry, Japan.

Tomoaki Hirakawa　総合理工学府 環境エネルギー工学 一貫制博士4年（博士2年）

We discussed the topic listed below.

(**Energy Resources**)

1. Different energy resources.
2. The current situation of the energy globally.
3. The effect of reduction of oil prices.
4. Which energy resources are potential to lead the future energy sector and how?

(**Answers**)

•Mainly, energy is divided into two groups which are the renewable energy and the non-renewable energy.

•In current situation, fossil fuels are dominant in energy consumption, and renewable energy is only about 15%.

•The reduction of oil prices will reduce cost of petroleum science products such as synthetic rubbers and polyester used for cloths.

•Because the main question should be the last one and others are leading questions, we spent most of our discussion time to figure out the last question. Since the potential resources are dependent on the location we consider, we decided to select three countries Japan, Nepal and China. I was in charge of the team on Japan. In my team, we decided to make use of a plan presented by the Ministry of Economy, Trade and Industry. According to the plan, as targets of the primary energy supply for 2030, 18% of the energy are going to be supplied by LNG, 25% by coal, 30% by oil, 13-14% by renewables,

and 11-10% by nuclear power. As targets of the electricity mix for 2030, 27% of the energy are going to be supplied by LNG, 26% by coal, 3% by oil, 22-24% by renewables, and 20-22% by nuclear power. The breakdown of renewables is 8.8-9.1% hydropower, 7% solar, 3.7-4.6% bioenergy, 1.7% wind and 1-1.1% geothermal. Summary:

•A renewable rich country, plans to use a mix.
•Increase solar, wind, geothermal, biomass.
•Decrease fossil fuels to only 30% by 2030

(**Nepal**)

2% comes from fact that 762MW used, 43,000MW economically viable under investment and restricted by location. Summary:

•Rich in only one kind of energy – hydroelectricity
•Large untapped energy reserves, requires investment
•Potential to be massive energy exporter

(**China**)

In 2014 China invested more money in renewable energies than either fossil fuels or nuclear, for the first time. Total energy from fossil fuels fell by 0.7%, whereas that generated by renewables grew 19%. Ref: China Electricity Council 2014. Summary:

•Huge amount of renewable potential, rapidly growing
•Focus on solar and wind
•Needs to develop transmission and storage, as energy sources far from population centers

Group 5 ……Topic 1

Leader : Tomy Alvin Rivai
Supporter : Animesh Pal , Masahito Tanaka

Muhamad Affiq Bin Misran ,
Eslam Naeim Hussien Abubakr ,
Masahito Tanaka , Animesh Pal ,
Tomy Alvin Rivai , Yoshiaki Takahashi ,
Cao Cong , Tsubasa Oji , Yusei Masaki

Animesh Pal

総合理工学府 環境エネルギー工学 一貫制博士4年（博士2年）

Green Asia Education Center of Kyushu University organized "International Forum for Green Asia 2016" on 1st December in Chikushi campus. I participated the program and also the student session. I was belong to the group 5 in the student session. Therefore, the assigned discussion topic was fusion energy. During discussion time we were discussed following key points: What is fusion energy? What are the advantages of using fusion energy? Research the feasibility of fusion energy and is it economic to keep investing in fusion energy? In our group, we were nine students from five different countries. As a result we had different opinions regarding the fusion energy. However, all of student in our group finally agreed that fusion energy could be another possible future energy resource. Following is the key points from our discussion. Fusion energy comes from the fusion reaction between two hydrogen isotopes: deuterium, and tritium. Basically, when deuterium and tritium nuclei fuse, they produce a helium nucleus, a neutron and huge amount of energy. Fusion energy is one of fortunate candidates for electricity generation due to abundant supply of fuels for nuclear fusion. Moreover, accident vulnerability in reaction is much less compared with fission. In addition, carbon dioxide (CO_2) emission is less compare to oil and coal based thermal power plant. Approximately 2000 scientists and engineers are recently working on a broad range of fusion research and development (R&D) projects in over 20 laboratories, including European Torus (JET). Furthermore, the domestic R&D's in Japan, the collaborator all over the world of the fusion, International Thermonuclear Experimental Reactor (ITER) project was started in 1985. After that collaboration among Japan, Europe, USA, Russia, China, Korea, and India was formed in 2007 to make ITER organization (IO) and their target were fusion output power of 500 MW at Q(gain)>10 for 500 seconds. Conclusively, fusion energy has the future to offer a viable solution to global energy demands. ITER is the world's highest energy scheme which purposes to establish that fusion can be a part of the solution by improving our energy blend to meet the global energy demands. Therefore, it will be economic to keep investing on fusion energy project. Engineers and scientists in this area should keep more focus for reducing the cost of this system to make more practical and profitable as it is an environment friendly. At the same time, government and organization should assist them. Lastly, it is important to mention that this kind of discussion among different fields' students can effectively improve our understanding, finding problem and solution.

Masahito Tanaka

工学府 地球資源システム工学 一貫制博士4年（博士2年）

Group 5 discussed applicability of fusion energy. When light elements such as deuterium and tritium are fused, it turns to helium and neutron. The energy can be obtained depending on the difference between the molecular weights. Generation of fusion energy has four advantages discussed in our student session; (1) less CO_2 emission compared to conventional power generation plants, (2) no radioactive waste unlike nuclear power generation, (3) abundant raw materials produced from sea water, (4) high energy production efficiency; for example, one gram deuterium-tritium can produce the energy as well as eight tons petroleum.

This fusion energy generation has been studied in some research institutes, especially ITER collaborated among countries such as Japan, EU, US, Russia, China, Korea and India. However, the practical trial production does not proceed. In terms of economic viability, it requires high capital investment because the construction of the system and plasma production cost become quite high. Main cost consumptions consists of grid system and specific direct conversion components (20%) and superconducting magnets (33%). Fusion energy generation needs much higher temperature (150 million °C) than the center of the sun. For this reason, plasma confinement shows high operation cost to maintain high temperature and fusion condition. This is one of the negative aspects of this energy. Therefore, further improvement of fusion power generation efficiency is required for well economic consistency between energy generation and consumption. Q value which indicates the ratio of fusion energy production and fusion plasma generation energy is 1.25 at the moment. Many research institutes all over the world tried to improve this Q value to over 10, especially up to 30. Moreover, resources consumption should be discussed for further development. The resources of fusion energy, deuterium and tritium come from sea water. Therefore, depletion of the resources does not occur. However, to produce tritium, lithium is required which is one of the resources possibly dried up. Utilization of lithium should be control to generate stable fusion energy for long term.

There are breakthrough advantages in fusion energy. However, the production is still in the middle of development. In addition, there are some negative aspects such as high capital, operation cost and low efficiency. It produces high energy which human has never experienced before. It thus remains in doubt we can control this power generation. However, to achieve the sustainable society not to utilize fossil fuels, it should continue to develop and be installed for sustainable society. One problem of this contains still low efficiency. Because feasibility remains, it however cannot be asserted that research should be stopped. For the novel possibilities unprecedented, we should keep investing to the development of fusion energy.

Group 6 ……Topic 2

Leader : Ni'Mah Ayu Lestari
Supporter : Sendy Dwiki

Fatin Hazwani Binti Mohamad Azahar ,
Wu Shun , Sendy Dwiki ,
Md Amirul Islam , Takaya Fujisaki ,
Ni'Mah Ayu Lestari , Keishi Oyama ,
Shinji Matsumoto

Sendy Dwiki

工学府 地球資源システム工学 一貫制博士4年（博士2年）

International GA Forum was held in Chikushi Campus, at 1st December

2016. It was divided into three main activities: lectures from invited guest, poster session and discussion as well as presentation of result of discussion from Green Asia students. The invited lecture firstly was delivered by Dr. Masaya Hanada, from Naka Fusion Institute, National Institute for Quantum and Radiological Science and Technology. His title is 'Research and Development for Fusion Energy in QST', where he mainly talked about latest development of the thermonuclear fusion that generates the power via the high energy neutron from reaction of deutreum and tritium plasmas. This large experimental fusion machines in project, namely JT-60, unfortunately has shut down in 2006. Moreover, the world-wide collaborative project has been developing (ITER or International Thermoneuclear Experimental Reactor) that has been participated by Japan, with QST as representative. After the achievements that were achieved by JT_60 and ITER performance, the fusion energy in Japan has been developed up until now. The second lecture is 'Role of Rock Mechanics in Mining Development in Indonesia', by Dr. Suseno Kramadibarata. He is the President and CEO of PT Bumi Resources Mineral in Indonesia and also was affiliated with Institut Teknologi Bandung and as President of Indonesia Rock Mechanics Society. In his lecture, he introduced about the basic of rock mechanics and its important role for mining, especially for safety reason when dealing with massive scale of natural rocks. Moreover, he also discussed about the development of rock mechanics in Indonesia regarding its as science and research. Lastly, Dr. Kenji Kato from Nippon Steel & Sumikin Engineering was discussed about the 'Leading Edge of Coal Utilization Technologies'. He discussed about the technology which currently available for low rank coal utilization in order to use this type coal for high energy efficiency. The technologies include: cokemaking, coal gasification and development of new cokemaking technology (SCOPE21).

The poster session was attended mostly by doctoral students of Green Asia. Divided by two duration time based on the odd and even numbers, student has to explain their current research to the reviewer. Even though not all of the students have chance to be able reviewed, it was a good opportunity for us to communicate with other academician whom might not familiar with our research field. This will increase the awareness of the importance of communication in order to be fully understood, especially in applying our research for society and opening up a possibility to build work with different research fields.

The last session was discussion time. Our group theme was about e-waste management, where we tried to explain the definition and our view regarding the e-waste. Basically, as the technology has been advanced currently and lead to the numerous innovations invented, the waste which was caused by the demand of high-end technology also escalated. Furthermore, the material that had been thrown away already equal to the proven resources in the world. In addition to that, the highly polluted materials also produced by this kind of waste. Therefore, we believe that e-waste needs to be managed carefully by implementing reduce, reuse and recycle, and also supported with adequate regulation and law to force the subject of e-waste producer to take care of their waste.

Group 7 ……Topic 3

Leader : Yuta Sato
Supporter : Tarek Mahmoud Atia Mostafa

Sameh Ahmed Okasha Zaki Mohamed ,
Muhammad Faisal Hasan ,
Tarek Mahmoud Atia Mostafa , Yuta Sato ,
Kitjanukit Santisak , Takayuki Maekura ,
Dabin Chung , Gede Dalton Surya Prayoga

Tarek Mahmoud Atia Mostafa　総合理工学府 量子プロセス理工学 一貫制博士4年（博士2年）

Mobile application development is a term used to denote the act or process by which application software is developed for handheld devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These applications can be pre-installed on phones during manufacturing platforms, or delivered as web applications using server-side or client-side processing (e.g. JavaScript) to provide an "application-like" experience within a Web browser. Easily the impact on the economy of such industries can be marked in several examples such as Facebook, Twitter, Instagram, Youtube, and Google. "The Four Horsemen" Amazon/Apple/Facebook/Google, are the most dominant tech companies with a higher combined market cap than the GDP of South Korea.

Mobile apps have changed how we negotiate our relationships with family, spouses and close friends. Increased levels of mobile apps subscriptions are linked with improvements in education, gender equality and political participation, particularly in developing countries. They are also associated with higher economic growth.

For example, a research report by the Cologne Institute for Economic Research, explored that mobile apps strongly influence economics, society and people's private lives across 10 countries – the UK, Germany, Italy, Spain, China, India, Turkey, Egypt, Kenya and South Africa.

The effects of increasing mobile phone subscriptions on GDP growth across 10 countries are all positive for the years 2010 to 2020, forecast to grow continuously in this period. They range between 1.8% in the UK and 24.9% in Egypt (compared with today's GDP).

I found this session very valuable and useful for me for several reasons such as:

•The topic is relatively new for me that encouraged me to read about new topics and get different type of information related to another field rather than my original one which is a bit far from this area of research.

•Due to the diversity in the group that we were 6 persons from five different countries and backgrounds, we could look to the problem with a wider view and discuss the problem from variant spots. Every time we reflect our discussion to the point of view of different person with different way of thinking, we could get deeper in the issue and in finding solution as well.

Group 8 ……Topic 4

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Supporter : Ryan Imansyah, Yu Narazaki

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I got the discussion topic number 4 which is about energy sources. There are 4 questions that should be discuss by the team. Here is the question and discussion result of our team :

•Different energy resources

Energy sources can be devided into 2 groups, renewable and non-renewable energy sources. The example of renewable energy sources are solar energy, wind energy, geothermal energy, and bio energy. While the non-renewable

energy sources are fossil fuels and nuclear fuels. The fossil fuels itself divided into 3 main energy resources, coal, gas, and oil.

•The current situation of the energy globally

It is believed that the fossil fuels will be finished in the near future due to the lack of total reserves of it. For example, oil deposits will be gone by 2052 if there is no increase in population growth, while the gas will give us the energy until 2060 if it is used to fill the energy gap left by the oil. On the other hand, coal is going to be last until 2088 to give us the energy.

•The effect of reduction of the oil prices

The effect of reduction in oil prices to the countries is depend on the status of its country, whether they are an importer or exporter. The reduction of oil prices means the reduction of cost of living because the transport cost will directly fall, thus it will lead to a lower inflation rate for the oil importer country such as Europe, Japan, and China. Besides the lower inflation, the impact of this reduction is higher output because there is more income to spend like on the other goods and services.

•Which energy resources are potential to lead the future energy sector and how?

According to the situation of the fossil fuels energy, it seems that the future energy source will be held by the renewable energy or nuclear energy source. There is some renewable energy that is potentially to give huge amount of energy such as wind turbines, however, this type of energy source is not good for the ecosystem since it's disturbing the birds line. The other renewable energy is transparent solar cell window, this technology can produce the energy without opening a new space for the installation. The ordinary window can be replaced by a solar cell, thus the solar power can be harvest easily without opening a new space for the solar cell.

In the nuclear energy side, nuclear fusion is attractive since it doesn't produce nuclear waste like the nuclear fission. Scientists are getting closer to pulling off this effect on earth, but the reactor are still expected to expend more energy than the producing. As the technology improves fusion will become an increasingly attractive option for future energy source.

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I took part in the student session after I have heard three keynote speakers' invited lectures and given my Ph. D research in the poster session at the GA forum. There were four types of an attractive discussion topic in respect to "Fusion Energy", "E-wastes Management", "Mobile Apps Economy" and "Energy Resource", respectively. Moreover, discussion teams were organized eight teams which each two teams discuss an above topic. I was in charge of a supporter in the team eight which team members were composed of Ms. Cheng, Ms. Alisa, Mr. Ryan, Mr. Tawheed and Mr. Ezaki, including me. We were talking about "Energy Resource" as Ms. Cheng was leading presentation contents. We all suggested various kinds of an opinion toward its topic, for example "energy recourse for the future" and "an expectation of renewable energy", by utilizing our related bringing materials. I was able to support our discussion and to determine some exiting pictures for our conclusion in our presentation slides. After we were discussing for two hours, it was time for us to give presentation to all of the GA students and staffs. Our presenters were Cheng, Alisa and Tawheed and contents were introduction of energy recourse, transition of it, its future plans and conclusion. I heard eight teams' respective presentations and understood "what and how is the Fusion Energy", "E-waste problems nowadays", "different between good and bad mobile apps" and "the trend of a energy resources for the future" base on shared attractive data and their thinks in presentations. Of course, our team was successful in the presentation. Finally, we, Mr. Yoneda, Mr. Ryan, Ms. Zayda and Mr. Tarek as a leader of each sections, were organized this forum in this time. Sometime, we created some dissensions during organization of the forum. However, we might be delight because this forum was quite smooth and successful. Especially, the student session was quite great because I was impressed that those who are coming from various countries discuss, corporate, finalize their opinions, thinks and viewpoints and present them toward a give topic. Moreover, they definitely consider economic, sociological and environmental aspects in their opinions and then their presentations were interesting and considerable. I believe that this opportunity is difficult for students without Green Asia program to experience if they want. Next challenge is coming soon so next leaders who are organizing the next GA forum will be required to produce more excellent next one than we did.

Topic 1 Fusion Energy

1. What is fusion energy?
2. What are the advantages of using fusion energy?
3. Research the feasibility of fusion energy.
4. Is it economic to keep investing in fusion energy?

Topic 2 E-wastes (electronic wastes) management

1. Different types of e-waste and global e-waste volume.
2. Man driving forces for e-waste recycling.
3. Recycling systems and policies in different countries.

Topic 3 Mobile Apps Economy

1. What is App economy?
2. Mobile Apps statistics in global scale.
3. The Apps economy growth and its effect on the global economy
4. Mobile Apps effect on different Societies
5. Mobile apps impact on the economy of the developing countries

Topic 4 Energy Resources

1. Different energy resources.
2. The current situation of the energy globally.
3. The effect of reduction of oil prices.
4. Which energy resources are potential to lead the future energy sector and how?