（Abroad・~~Domestic~~）Internship report form（Student） 2017/03/31 (Year/Month/Day)

Name	Jednipit Borthong
Laboratory	Division of Bioinformatics, CZC
Year (Grade)	D4
Internship institution	Faculty of Public Health, Thammasat University, Pathumthni, Thailand
Internship period	Internship period: 03/06/2017 - 03/17/2017 (Departure Date from Sapporo: 03/03/2017, Arrival Date in Sapporo: 03/19/2017)
Purpose	Internship

This report should be submitted within 2 weeks after you return to Japan.

- The reason why you chose this institute

I chose this institute because the Faculty of Public Health, Thammasat University is a research institute, and they are work for infectious diseases. Although the Faculty of Public Health, Thammasat University had been recently established, professors, lecturers, and staffs came from famous universities in Thailand and other countries. They are expertise in fields of infectious diseases. Many fields of researches have been conducted in this institute such as antimicrobial resistance in zoonotic pathogens, monitoring enteropathogens in aquatic environments, development of rapid diagnosis for *Rickettsia*, and *Leptospira*, Influenza viruses, foodborne viruses, transmission of malarial parasites and Dengue viruses in urban and rural areas, and molecular epidemiology in pathogenic *Escherichia coli* from swine farms. Moreover, they have worked on public health surveillances and bioinformatics in this institute.

I am a Thai citizen, and I would like to work with infectious diseases in Thailand. I am preparing myself by gathering knowledge, skill, and experience for working with infectious diseases. Understanding these things will support my career for working in government officers and academic institutes. Moreover, connections of networks and relationships of collaborations from professors at the Faculty of Public Health, Thammasat University may help me to get a job in Thailand. Thus, I decided to go to the Faculty of Public Health, Thammasat University, Thailand.

- Result of the activity （about 800 words, provide photos, tables and figures that clearly show the

activities during the period)

Activities at the Faculty of Public Health, Thammasat University were included four parts, study tour, lectures and discussions based on infectious diseases, conference, and experimental study (Table 1). The activity was organized and supervised by Prof. Emeritus Orasa Suthienkul and team. The details and results are described below.

The activity of study tour, I visited two centers and one institute (Fig.1 – Fig.3). The places were Laboratory Animal Center, Thammasat University (LACTU), Center of Scientific Equipment for Advanced Research (TUCSEAR), Thammasat University, and National Center for Genetic Engineering and Biotechnology (BIOTEC).

LACTU provides me basic knowledge of experimental animals such as kind of animals, how to handle animals, animal policies, and how to process animal carcasses. In addition, I was allowed to observe the equipment and facilities in this center.

Staffs in TUCSEAR showed me the equipment and facilities for using in researches. Here, we had discussion on computer software for using in bioinformatics analysis.

BIOTEC is a member of National Science and Technology Development Agency (NSTDA). Aims of this institute are research and development for increasing yields of products using biotechnologies. BIOTEC are focusing on four sides following food and agricultural production, medical and public health, power and environments, and bioresources. I visited two laboratories at Genome Research Laboratory, Genome Technology Research Unit and Protein-Ligand Engineering and Molecular Biology Laboratory, Medical Molecular Biology Research Unit. The lecture showed me plant researches using Next Generation Sequencer and a new antimalarial drug for malarial parasites. The results of study tour make me know available equipment and facilities in these institutes. It is useful information for planning researches in future. Additionally, this activity is a beginning of collaboration with people in these institutes. It is useful for my career in future.

The activity of lectures and discussions based on infectious diseases was arranged at the Faculty of Public Health, Thammasat University (Fig. 4). The understanding of etiological pathogens, susceptible hosts, and environments are

important for prevention and control of infectious diseases, and these things were included in the topic of lectures. I learnt antimicrobial resistance in *Escherichia coli* isolates from shrimp farms and swine farms, molecular epidemiology of *E. coli* isolates from swine farms, monitoring enteropathogens in flooded water and canals water, Scrub typhus, Leptospirosis, Influenza viruses, foodborne viruses, vectorborne disease, public health surveillances for infectious diseases, and bioinformatics. From lectures, I can link the association of bioinformatics and prevention and control of infectious diseases for example design of PCR primers for detecting pathogens or antimicrobial resistant genes, sequence analysis for investigating sources of outbreak of pathogens, identification of protein sequences using blastx, and use protein for making a rapid diagnostic test kit, genetic diversity in pathogens and vectors. Moreover, I learned that the policy for control of vectorborne is not comprehensive prevention in some disease. For example, malaria is problematic disease in rural area, especially Thai-Myanmar border and Thai-Cambodia border. *Plasmodium falciparum* and *P. vivax* are main cause of malaria, and vectors of these parasites are different species. In Thailand, the policy for control of malaria using nylon nets and coded nets with a chemical reagent is very effective to protect bitten mosquito, which is a vector for *P. falciparum*. Number of patients with *P. falciparum* infection has decreased but number of patients with *P. vivax* has increased. Thus, this activity helps me understand for prevention and control of infectious diseases including gaps and limitations of a single policy for prevention and control of infectious diseases.

I was attendance to conference (Fig. 5). I participated the 5th Annual International Conference on New Voices in Global Health and Development 2017 at Thailand Science Park Convention Center, Pathumthani, Thailand on March 10th, 2017. All researches were related with social sciences. Only three researches were related with infectious diseases. However, those researched were not experimental study. They collected data using questionnaires, interviews, and systematic reviews. The first research was focused on vaccination status of asylum seekers in asylum centers in Netherlands. The second research explained the barrier of treatment between HIV/AIDS patients and healthcare workers in Indonesia. The other research explained the problem of managing TB programs in Public Health Care Centers of Kota Denpasar, Indonesia. The causes of problem were weakness of case finding, lack of human resources for laboratory

examination, barriers to TB treatment, lack of home visit, and obstacles and proposed solutions from TB program managers. The participation of this conference gives me ideas and concepts for working with infectious disease. I can apply these data for prevention and control of infectious disease in my career in future.

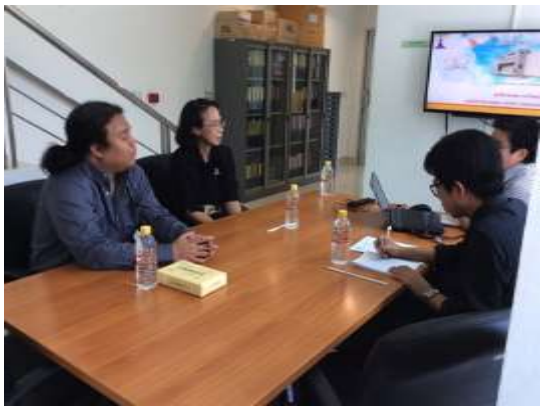
The last activity at the Faculty of Public Health, Thammasat University was DNA preparation for metagenomic analysis. This is a part of my thesis. I collected two liters of water samples from five points of a canal in urban area, Bangkok, Thailand (Fig. 6). Bacteria in water samples were concentrated using filtration technique. Bacterial DNA was extracted using PowerWater DNA Isolation kit Sample (Mo Bio Laboratories, Inc.). All of DNA samples will be sequenced at Research Center for Zoonosis Control, Hokkaido University.

As of Mar 19, 2015

Table 1 Schedule of study activities at Faculty of Public Health, Thammasat University during 6 – 17 March 2017

Date	Time	Topic	Location
March 6th, 2017	09:00 – 12:00	- Introduction and orientation - Background presentation: internship student (Prof. Orasa Suteinkul and team)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	- Rangsit campus study tour - Laboratory tour (Prof. Orasa Suteinkul and team)	Central Laboratory, Laboratory Animal Center, Laboratory at Faculty of Public Health, Thammasat University
March 7th, 2017	09:00 – 12:00	Antimicrobial resistance in zoonotic bacteria (Dr. Kanjana Changkaew)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Monitoring enteropathogens in flooded water and canal water (Prof. Orasa Suteinkul)	Faculty of Public Health, Thammasat University
March 8th, 2017	09:00 – 12:00	Scrub typhus (Assoc. Orof. Uraiwan Kositanont)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Leptospirosis (Assoc. Orof. Uraiwan Kositanont)	Faculty of Public Health, Thammasat University
March 9th, 2017	09:00 – 12:00	Influenza virus and foodborne viruses (Dr. Pirom Noisumdaeng)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Bioinforamtics 1 (Dr. Pirom Noisumdaeng)	Faculty of Public Health, Thammasat University
March 10th, 2017	09:00 – 12:00	Attending on the 5th Annual International Conference on New Voices in Global Health and Development 2017 (organized by Faculty of Public Health, Thammasat University)	Thailand Science Park Convention Center, Pathumthani, Thailand
	13:00 – 17:00		
March 13th, 2017	09:00 – 12:00	Vectorborne disease 1 (Assist. Prof. Adisak Bhumiratana)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Vectorborne disease 2 (Assist. Prof. Adisak Bhumiratana)	Faculty of Public Health, Thammasat University
March 14th, 2017	09:00 – 12:00	Preparation of DNA samples for metagenomic analysis	Faculty of Public Health, Thammasat University
	13:00 – 17:00	MLST for molecular epidemiology (Lect. Watsawan Prapasawat)	Faculty of Public Health, Thammasat University
March 15th, 2017	09:00 – 12:00	Public Health surveillance for infectious diseases 1 (Assist. Prof. Adisak Bhumiratana)	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Public Health surveillance for infectious diseases 2 (Assist. Prof. Adisak Bhumiratana)	Faculty of Public Health, Thammasat University
March 16th, 2017	09:00 – 12:00	Preparation of DNA samples for metagenomic analysis and self study	Faculty of Public Health, Thammasat University
	13:00 – 17:00	Preparing for presentation	Faculty of Public Health, Thammasat University
March 17th, 2017	09:00 – 12:00	NSTDA study visit (Prof. Orasa Suteinkul and team)	National Science and Technology Development Agency, Pathumthani, Thailand
	13:00 – 14:30	Bioinformatics 2 (Assoc. Prof Chanwit Tribuddharat)	Faculty of Public Health, Thammasat University
	14:30 – 17:00	Summary and presentation (Prof. Orasa Suteinkul and team)	Faculty of Public Health, Thammasat University

(a)



(b)

Fig. 1 Study tour at Laboratory Animal Center, Thammasat University (LACTU). (a) Center of LACTU. (b) Lecture of basis information of animal uses.

(a)

(b)

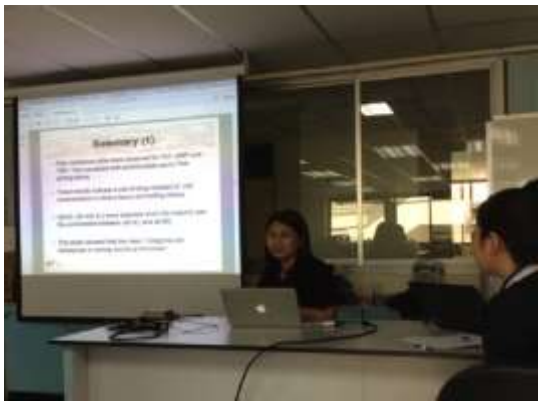
Fig. 2 Study tour at Center of Scientific Equipment for Advanced Research, Thammasat University (TUCSEAR). (a) Lecture of using microscope. (b) Discussion on software for data analysis from Next Generation Sequencer.

(a)

(b)

(c)

Fig. 3 Study tour at National Center for Genetic Engineering and Biotechnology (BIOTEC). (a) Introduction for the structure of institute, research fields, and research products from BIOTEC by lecturer. (b) Introduction for research based on next generation sequencer by lecturer. (c) Introduction for a new antimalarial drug by lecturer.



(a)

(b)

(c)

(d)

Fig. 4 Lectures and discussions based on infectious diseases at the Faculty of Public health, Thammasat University. (a) and (b) Lecture and discussion in title of antimicrobial resistance in *E. coli* isolated from shrimp farms and swine farms. (c) Presentation and discussion in bioinformatic analysis. (d) Group photo of Professors, lecturers and teams who involved in this activity.

(a) (b)

Fig. 5 Attending the 5th Annual International Conference on New Voices in Global Health and Development 2017 at Thailand Science Park Convention Center, Pathumthani, Thailand on March 10th, 2017. (a) Environment in the conference hall. (b) Certificate for participates.

(a) (b)

Fig. 6 Experiment study for metagenomic analysis. DNA of bacteria was extracted by commercial kit. (a) Collection of water samples from canal in urban area, Bangkok, Thailand. (b) Bacterial concentration using filtration technique.

- What do you think the positive impact of the activity will have on your further career path?

The activity of internship at the Faculty of Public Health, Thammasat University helps me to understand the overall for prevention and control of infectious diseases including surveillance systems. From lectures and discussions, I clearly see that how to use bioinformatics for prevention and control of infectious diseases. I can understand problems of disease outbreaks, limitations of policy, a strategy for vector control in each landscape. I also learn how to set the research of public health. All experience from this activity will support me for working in government office and/or academic institutes in future. Moreover, this activity made a network of collaboration with researchers at the Faculty of Public Health, Thammasat University, LACTU, TUCSEAR, BIOTEC, and invited lecturers from other university. This collaboration will be helped me for finding job in future.

- Advice for your junior fellows

For junior students who want to go for internship at the Faculty of Public Health, Thammasat University, I suggest you to contact professors and introduce yourself by email. Professors may ask you the purpose of visit and your expectation. In my case, I informed them that I would like to learn about prevention and control of infectious diseases, public health surveillances, and bioinformatics. Besides, you should avoid going in April because they have long national holidays in Thailand.

Approval of supervisor	Institution・Official title・Name Division of Bioinformatics ・Professor ・ Kimihito Ito 印

※1 Send the electronic file to the Leading School section, International Affairs Office, also submit the original print out with seal of supervisor to the Leading School section, International Affairs Office.
※2 Attach a copy certificate of the content of internship activity that is prepared by the counterpart at the internship institution (any form with a signature of the counterpart).
※3 The Steering Committee of the Leading Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.

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