Must be typed

（For JSPS Fellow）

Form B-5

Date（日付）
19/12/2016（Date/Month/Year:日/月/年）

Activity Report -Science Dialogue Program-
（サイエンス・ダイアログ事業　実施報告書）

- Fellow's name（講師氏名）: Yvan Antonio Llave Perez （ID No. P16102 ）

- Participating school（学校名）: Akita Prefectural Yokote High School

- Date （実施日時）: 15/12/2016 （Date/Month/Year:日/月/年）

- Lecture title（講演題目）:
（in English）Food Engineering as a Tool for the Development of the Food Industry
（in Japanese）食品産業の発展のためのツールとして使用する食品工学

- Lecture summary（講演概要）: Please summary your lecture 200-500 words.

The lecture consisted of thre main parts.

1. Brief introduction of life, nature, etc of the lecturer country

A detailed explanation with pictures of Peru was shared.

2. Lecturer life as a researcher and the reason why he bacame a researcher, and the basic story of lecturer research content

The motivations to become a food engineer (including the highlights of the Peruvian cousine summarized in a short video) and the basics of Food Enginnering, its importance for the development of the food industry and its conexion to Food Modeling (the main topic of the lecture) were detail explained.

3. Most advanced research

This last part included the detailed explanation of three research works that the lecturer shared with the students. As follows is showed the summary of the lecture.

Even though thermal heating of foods involves multiple physical effects, food product development has proceeded via trial and error, which is a very time-consuming and expensive approach in the food industry. Experimental techniques alone sometimes are insufficient for optimizing food product design to achieve uniform heating due to the complex interactions of heating mediums with various food components; therefore, predictive simulation by modeling is desirable. Modeling is one way to design and optimize food thermal processes where some complexities have been reported due to coupling of the heat and mass transfer (besides additional phenomena) and the solution of several calculations schemes accordingly to the designed food system. To solve these calculation equations, a series of approximations must be made according to the specific

situations in order to simplify the problems to the point where they can be solved computationally (e.g. partial differential equations solved using commercial software).
Recently, multiphysics models were developed to characterize the heating of food products in several thermal process systems. These models can enhance the understanding of interactions between the heating mediums, food components and food properties (thermophysical, electrical and mechanical) and serve as an excellent tool for food product developers during the design of a food product that e.g. cooks more uniformly across a range of heating devices. Physics and Engineering–based models of food processes can complement experimentation by providing a vastly improved understanding that is difficult to obtain with experimentation alone. As a demonstration, will be presented a framework of multiphase, multicomponent transport together with solid mechanics that provides shrinkage and/or browning based on heat and mass transfer and thermal protein denaturation coupled with various heating modes (conventional, radiant or dielectric) using samples of roasted eggplant, grilled fish and defrosted tuna. In conclusion, the potential for the use of simulation (a basic Food Engineering tool) for the development of the food industry to enhance food safety and quality was shared.

- Language used（使用言語）: English

- Lecture format（講演形式）:

◆Lecture time（講演時間） 90 min（分）, Q&A time（質疑応答時間） 15 min（分）

◆Lecture style（ex.: used projector, conducted experiments）
（講演方法（例:プロジェクター使用による講演、実験・実習の有無など））
It was a theoretical class uing a projector.

◆Interpretation（ex.: assistance by accompanied person, provided Japanese explanation by yourself）（通訳（例:同行者によるサポート、講師本人による日本語説明））
Assistance by accompanied person.

◆Name and title of accompanied person（同行者 職・氏名）
Taketomo Ozeki (MS candidate)

◆Other note worthy information（その他特筆すべき事項）:
According to the coordinations with Setsuko Fujisawa from the Overseas Fellowship Division, International Program Department (Japan Society for the Promotion of Science), it was decided to stayed 1 night before the lecture considering the travel distance for both (the lecturer and the accompanied person). By post the filled format as well as the receipts were send.

- Impressions and opinions from accompanied person（同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。）:
It looks so nice opportunity for a Japanese post graduate student to attend a 'real science lecture' in English by a specialist. It was no simple for the students but the lecture definitely stimulated the student's subconscious which from henceforth will want to know deeper specific knowledge. I really recommend to keep this opportunity for students and international teachers to understand each other's situation.