Experience report

Participation at the Summer School in the University of Hasselt in Belgium

by Linda Kuaguim

My Name is Linda KUAGUIM, 25 years old. I am Masters Student in micro systems and Nano Technology in the University of Kaiserslautern – Zweibrücken Campus.

I started my summer school at the University of Hasselt in 07 September 2015. I have always been fascinated to do learn more and increase my knowledge on a foreign country during my studies. I have been several times to the south of Belgium and this summer school has offered me a great opportunity to visit the Flanders parts and of course has given me some insight about the culture, style of living and mentality of the Flemish people. After registration which was via email, I was invited to a meeting, where i met people from different universities, who participated in the project Functional Materials and Coatings and so far I also met partners from the University of Hasselt (Belgium), INESC Microsystems and Nanotechnology, Department of Bioengineering Técino of the University of Lisbon (Portugal), Max Planck Institute for Polymer Research (MPI-P, Germany) and the University of Applied Science Kaiserslautern – Zweibrücken Campus, Germany. During this same meeting the goal and activities for this project were clearly discussed and explained.

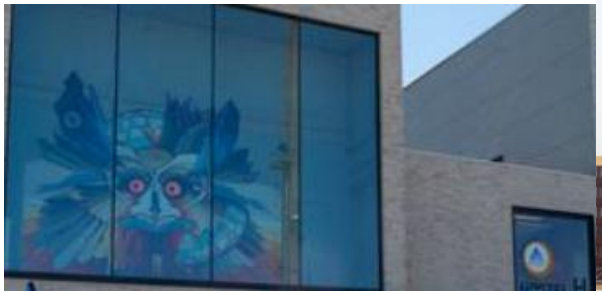
Two days after the meeting, I received an email which confirmed my participation for the summer school in the University of Hasselt. I was ecstatic about it and began to research on the history of Hasselt, the beautiful places and available opportunities for students.

One week before arrival I was given all the necessary information regarding the bus connections, information on how the program will run like etc. The accommodation was taken care of and we just had to confirm our presence through registration.

Hasselt is a Belgian city and municipality, and capital of the province of Limburg. Hasselt contains a number of historical buildings (St. Quentin's Cathedral, the "Herkenrode Abbey refuge house"), contains also restaurants brasseries, cafes and taverns, expensive shops with the most famous brands and many touristic places (National jenever museum...). Dutch is the most spoken language in Hasselt, often with Limburgish accent. The Hasselt dialect is only one of many variants of Limburgish (overlapping term of the tonal dialects). When I first heard the word Dutch, I thought for a moment, it was "Deutsch" in another pronunciation. Here people are very social and most do speak English.

Hasselt railway station is near the City Centre. The station is an IC station, which means there are several connections each day with important Belgian cities. The restaurants were expensive (especially traditional Belgian recipe) thus we decided to cook ourselves.

Picture of hostel H



Picture of rail station

In the hostel, breakfast was opened every day from 7:30 till 9:30. The lectures began on Monday at 9:30 and ended at 17:30. At 8 o'clock we went down for breakfast. In the hostel, there were many international students who were working on different projects but we the students from Kaiserslautern University were working on the project "Meeting Point Functional Layers".

At 9h10 we went by car to the University. When we arrived the Diepenbeek Campus, we were fascinated by the beauty of the university (especially the ‘D’ building). Hasselt is a Belgian University, with 2 Campuses; Hasselt and Diepenbeek, with Hasselt as head office. On campus Diepenbeek are located several institutes like IMO (Institute for Material Research), small enterprises, and several small businesses interacting with the research activities of the university.

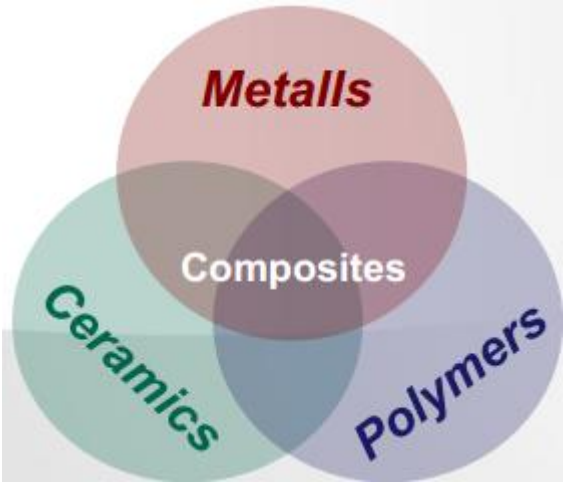
Hasselt University

PROJECTS PROGRAM

During the week we had lectures with professors and presentations with PhD-students, and also participated in several laboratory works etc. Every day, we had two coffee breaks at 11:15 and at 3:15 all together with drinks, fruits, and cakes. The lunch was from 1:00 to 2:00. The lunch was perfection, especially on the last day since it was cooked with delicacy and allergies were taken into consideration. When I think of this last lunch, it just keeps on exciting my taste buds and giving joy.

- **Monday**

  We started with an introduction to the Summer school. The first lecture was an Introduction to (Bio) polymers. **Biopolymers** are polymers produced by living organisms. Biomaterials can be from bio-feedstock or from bio-minetica using a variety of chemical approaches utilizing metallic components, polymers, ceramics or composite materials. Often polymer biomaterials are purely synthetic (Bio-minetica).



Biomaterial are often used and/or adapted for a medical application, and thus comprises whole or part of a living structure or biomedical device which performs, augments, or replaces a natural function. Biomaterials are used in:

- Bone cement
- Dental implants for tooth fixation
- Heart valves
- Cochlear replacements
- Contact lenses
- Breast implants
- Drug delivery mechanisms
- Stents
- and more

Biomaterials must be compatible with the body. Biocompatibility after IUPAC definition is the Ability to be in contact with a living system without producing an adverse effect. By first studies, polymers were made from chain growth polymerizations (Staudinger) and the first production of polymer was done by step-growth polymerization. The distinction between

step-growth polymerization and chain-growth polymerisation refers to the difference in reaction mechanisms; step-growth uses growth with the functional groups of the monomer compared to the free-radical or ion groups used in chain-growth polymerization. The three others lectures were: syntheses and properties of organic materials (plastics electronics), Polymer surface modification (surface activation, surface chemistry), and ceramic Materials and their use in functional coatings. We had four presentations which were to give us an overview before the lecture. The four presentations were based on Polymer synthesis (MIPs polymer), (bio) sensor applications and plastics electronics with solar cells.

- **Tuesday**

  We had our first lecture which was on Printing and coating techniques for functionalised. I learned new coating techniques such as screen printing, ultrasonic spray coating. Screen printing is a technique which is used to transfer ink onto a substrate. Spray coating; like spray, very small droplets are deposited gently on a substrate.

Other lectures were on Biosensor and organic based Photovoltaics and the five presentations which helped us our Knowledge on the Tuesday´s lecture. After the lecture we made shopping, and cooked together in the hostel. The hostel has a big and well equipped kitchen.

- **Wednesday**

  This was the shortest day, the day of laboratory practical and we were home earlier. There were two labs and we had to choose one:

  - Lab work 1: Chemistry
  - Lab work2: Printing and Coating

I chose Lab work 2: Printing and Coating. During the practical I learn new techniques like screen printing and spray coating. The other side I had already done spin coating and measurement in Glove Box, during my studies back in the University of Zweibrücken. [Glove box is often used to process materials that are sensitive to moisture or concentrations of different gases]. This practical also gave me an opportunity to do some practical on Inkjet printing.

- **Thursday**

  We had three lectures with no presentation. These lectures were on coating via the FTIR techniques, microscopically and crystallographic characterisation and analysis of the surface using ultraviolet and X-Rays.

  After the lecture we made a sight-seeing and visited the chemistry and Physic laboratories. Printing and coating were done in the physics laboratory, we went to the Jenever museum (Gin museum). Jenever or Holland gin is a national and traditional liquor of the Netherlands and Belgium. In museum, I learned more on the history of Jenever. Different gains are used during the production process of jenever. In the museum we could get different aromas (fruit, pepper, Rosa, cacao, herbs...) used for the production of jenever. Jenever is a hard alcohol, around 20% vol alcohol, when it is fruit flavoured and around 40% vol alcohol by neutral Jenever. At end we had the

opportunity to taste 1 liquor of our choice [between neutral Jenever (like vodka) and fruit flavoured Jenever].

The picture below shows Jevener bottle in Jenever museum

- **Friday**

  One was supposed to leave the room and return the keys, before arriving on Campus, for the last two lectures. After the lecture I went to town for shopping. I bought chocolates for my siblings and also took many pictures.

Finally participating in the summer school in the University of Hasselt was a good idea and I strongly recommend this kind of programme to all students, who want to acquire an experience in foreign countries during their studies. This program does not only help one ameliorate his/her English knowledge it turns also to increase our Knowledge on new techniques in our study-field such as biosensor application, the function for ceramic materials in coating, printing and coating techniques, photovoltaics, characterization of coating with FTIR techniques, Microscopically and crystallographic characterisation , and applications of functional coating in real life. Above all it gave me the opportunity to learn a new culture, meet interesting people and have a taste on Belgians' delicious caramelized Wafers and chocolates.