

Report of sabbatical leave to Copenhagen University (Denmark)

Nov 4th 2007 till May 4th 2008

By: **Mohsen Kompany-Zareh**

I arrived to Copenhagen airport at 4th of May 2008. Thomas Skov (PhD student at Dept of Quality and Technology) was waiting for me at airport. He is warm and kind. A completely flat and green land. There were not many high buildings in the city. It was about 12 O'clock, but sun was tilt, just like 4 O'clock in the evening in Iran. Sky was deep blue and with very low level of pollution. Temperature was lower than Iran. The main difference to Iran was variety of colors that could be seen all around the city, and sand and dust was very low. Peoples on the bicycle were very much in the city, and there was no traffic jam from cars. An interesting point in the first hours of arriving to this lovely country was posters of a candidate for the parliament who was arab and muslim. During the next days I found that there are many different parties in this small country, with 5,000,000 population. Another interesting point was the many unlocked bicycles around the metro station.

Copenhagen has the advantage of being beside the sea. Temperature fluctuotons are not very much, during winter and summer. But it is not humid as our coastal cities, such as Booshehr and Anzali, because it is close to the north pole and is cool. Most of the short days of winter was gray and cloudy, and wet.

Thomas lead me to Eske's home. Eske Benn Thomsen is a kind Danish guy. He is BS student of agricultur. I rented a room in his apartment for 3500 Danish Kroner (DKK) for more than one month. A furnished, modern and luxury room with internet connection, and shared kitchen and bathroom and TV. His home was in Frederiksberg, which was one of the best places in Copenhagen.

The next day I went to University of Copenhagen, Faculty of life sciences, department of food sciences, quality and technology (Q&T) (the fourth floor) of a concrete building at Rolighedsvej 30. Firstly, I visited Mehdi Farahani, an irannian lab technician at Q&T. From the first visit he was kind and helpful.

I visited Rasmus Bro. He is sharp and clever, and of course kind and friendly looking illustrated that his kindness. About 30 minutes he talked kindly and explained to me. During the next days I found that his minutes and seconds are valuable, and spending 30 minutes in a very kind way was his high degree of hospitality.

Few days after my arrival Rasmus invited me to EuPAT2 (European Process Analytical Technology) conference. It was his second kindness because the conference was expensive and he payed for me. From all around Europe, professionals in the field of process and quality control were in the conference. They were mainly from Biotechnological and pharmaceutical industries. Specially, from Scandenavian countries such as Sweden, Norway and Finland many scientists took part in the conference. More than 20 oral presentations were held in the seminar.

My Family joined me before Christmas 2008. Before their coming I searched a lot for a suitable apartment, and of course, Gilda (the secretary of department) helped me very much. Finding apartment for rent in the central part of Copenhagen was not a

simple job. During this seeking, I learned many places in Copenhagen. I went to different parts of city, such as Norrebro and Easterbro, and I met different people. Some of the apartment did not include bathroom inside the apartment. A heard that there are a few old apartments in the central part of the city which includes no bathroom inside! . Finally, Gilda found an apartment in Vestebro (Saxogade, 94, 4 SAL Tv (4th floor, left one)). The building was under renovation and when I moved there in the 14th of December 2007, I was the first residence and it was not completely furnished. Rent of the apartment was 7,400 DKK per month (7,200+200 for internet connection)!!.. My money from Iran was about 9200 DKK per month. I asked Rasmus about finance, and without any hesitation he agreed to pay half of the rent. I also needed 22,000 DKK deposit for the contract and he pay it. I do not know what I would have done, if he had not offered this valuable support...

In the 12 O'clock of midnight of December 2007 or 00:01 of morning of Jan 1st 2008 we were in the center of Copenhagen, close to our apartment. Suddenly fireworks began and it was magnificent. The City was full of beautiful fireworks and it was just like a battle field, lights and big sounds from all around.

During this six months leave, beside my family, we had short trips to Sweden(Lund, and Malmo), Norway(Oslo), Austria (Vienna), Slovakia(Bratislava, Matrin, and Zhilina).

Scientific report:

There was a **course in multi-way Analysis** that was presented by Rasmus Bro and Frans van den Berg. Passing Multiway Analysis under Rasmus Supervision is like passing Bible under Jesus supervision! In this course there were 14 other students from all around Europe and Russia, and again I was guest. Session durations was in 20 minutes, 5 to 10 minutes rest between each session. Presentations were about two weeks and in the third week we proposed to complete a project report. Project was an exercise on a real set of data. Each couple of student was working on a set of data. Rosaria (an Italian statistition, who is postdoc at Copenhagen Univ) and me were working on sensory data from food analysis department. It was interesting for her that I suggested her to be the head of our group. She worked efficiently and always thinking about the main goal of work. If there was a serious problem during doing the project we asked Rasmus and He only thought for few second and after writing one line or a very short Matlab command he solved the problem. He is really professional in programming. His brain is a very rapid processor... The project report is attached.

A part of work which was approximately finished was studying the **concistency and simplicity of the core array in tucker**. This part of study is more than 90% completed and will be presented as scientific oral report at faculty of chemistry. The report on this par is also attached.

Using help from Rasmus and Frans I submitted a proposal to the Ministry of research and Technology of Denmark. Subject of Proposal is **Application of hard-modeling** in investigation of interaction of small Drug molecules to DNA. Jose Manuel Amigo, who is a young postdoc from Spain, also, made many valuable helps in preparation of the proposal.

A part of what I did in Copenhagen university was together with Frans van den Berg. He is a saint! The door of his room is always open to everybody and he does anything he can for everybody in department, without expecting anything. He is from Netherlands and very precise in work. He is excellent in theory and I learned many things during our discussions. He is professional in wrote an excellent routine for **discrete wavelet**. We applied the program on a series of Raman Spectra from a highly overlapped sugar samples. The aim in work was a **calibration transfer**. The brief report on this part is also attached.

Carsten Ravn is a pharmacist who is working in Novo Nordisk, which is a famous Danish pharmaceutical company. He helped me in measuring **IR microscopic images** from a number of thin layer chromatographic (TLC) plates. Plates were from development of spots from some mixtures of **amino acids**. My wife, who is a pharmacist, assisted me in development of the plates. I did some screenings on the data from FTIR microscope. The study is not finished, yet, but resolution of aminoacid peaks seems possible. Calculation on the data from this part is not completed.

Mohsen Kompany-Zareh, June 2008

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