

Final Internship Report

Host Institution:

Department of Plant Sciences
Weizmann Institute of Science
P.O.B. 26 Rehovot 76100, Israel

Supervisor:

Dr. Asaph Aharoni

Home University:

Ludwig-Maximilians Universität (LMU)
80539 Munich, Germany

Field of Study:

Bioinformatics

Internship Period:

1.10.2010 – 31.12.2010



First and foremost of all, I would like to dedicate my sincere gratitude to Dr. Asaph Aharoni for accepting me for the internship period in his lab at the Weizmann Institute of Science in Rehovot. I also would like to thank the 'Student und Arbeitsmarkt' organization for providing the financial support, without which I would not have been able to get such a wonderful internship experience. Last but not least, I would like to thank Dr. Leonid Brodsky, Dr. Ester Feldmesser, Dr. Dena Leshkowitz, Dr. Gilgi Friedlander and Dr. Jaime Prilusky for their invaluable guidance and care.

During my internship in Israel I have learnt indeed a lot about processing and analysis of the next generation sequencing and microarray data. The genuine friendship I established with the local and international people are also very valuable to me.

I. Preparation

1. Searching For an Internship

The internship at the Weizmann Institute of Science was primarily organized by me. I wanted to go abroad for an internship because of the opportunity of gaining insights into different fields of bioinformatics, expanding my research skills, getting working experience and practicing my English skills. An internship would also allow me to get to know a foreign country, its culture and people.

I could never imagine that finding an internship abroad would be such an easy and straightforward task. But let's start from the beginning...

At the time point when I decided to go to Israel for an internship I asked Prof. Dr. Karsten Suhre, one of my professors at the LMU, for a contact in this country. Prof. Dr. Karsten Suhre has kindly provided me an e-mail address of the Israeli scientist working primarily on the investigation of the plant metabolome and transcriptome, the topic that was new to me and I was very interested in. The name of the scientist was Dr. Asaph Aharoni. He worked as a PI at the Weizmann Institute of Science in Rehovot. After sending him an email with the request for an internship and my CV, the next day I received the reply allowing me to carry out my practical experience in his lab.

The internship in Dr. Aharoni's lab was intended to be unsalaried, so I applied for the financial support at the 'Student und Arbeitsmarkt' organization.

2. Preparation and Expectations

Since the internship was unpaid and I intended to stay in Israel for only three months I was issued a tourist visa upon arrival at the Ben Gurion airport in Tel Aviv. A tourist visa is free of charge and can be extended (fee required) at the Ministry of the Interior without any problem. Beside a passport that is valid for at least 6 months the only requirement for entering the country is a return ticket from Israel.

Unfortunately, housing on the campus of the Weizmann Institute was a problem since the Institute was reconstructing the visiting student dormitories. Therefore, I stayed in a rented apartment that an employee of Dr. Aharoni took care of. The one-bedroom apartment was very nice. It was located very close to the Institute, was fully furnished, had a kitchen, a TV and wireless internet access. The cost for the apartment was unfortunately also quite high.

It is generally accepted that the shorter the period of stay the higher the cost for renting per month. There are a number of Israeli websites advertising rooms and apartments for renting that I can strongly recommend. These are <http://www.roommates-israel.com/>, <http://www.winwin.co.il/>, <http://www.homeless.co.il/> and <http://www.yad2.co.il/>.

The Weizmann Institute is a multidisciplinary research institution and is home for more than 3000 national and international scientists. This year it was ranked second among the top international academic institutions as the “Best Places to Work in Academia“. As mentioned above, I came to the Institute full of expectations and I can admit that all of them were exceeded. I was very proud of being the part of the Institute stuff and I am very thankful to everyone who made it possible for me to be able to enjoy such a wonderful internship opportunity at the Weizmann Institute of Science in Israel.



Sderot Hen Street, the street where my apartment was located.

II. The Work

1. Responsibilities

One of the main topics of Dr. Aharoni's lab is to elucidate how plants make their outer surface. The surface of plants is composed of the two main layers, the outer cuticle and the epidermis underneath that provides substances (i.e. cuticular lipids, phenylpropanoids, terpenoids and more classes of chemicals) for the construction of the cuticle. The goal of my work was to identify genes and proteins that mediate the construction of the cuticle in the outer surface of fruit.

The approach that Dr. Aharoni took so far was to carry out large-sequencing of transcripts derived from multiple fruit species (e.g. melon, tomato, banana) in order to identify peel or skin associated transcripts. The new generation sequencing data was already available and was generated through either 454 or Solexa sequencing.

During the last three months I have learnt how to process, analyse and interpret new generation sequencing data combined with microarray data. My responsibilities included assembly of potential transcripts for each of the species, their functional annotation and identification of peel-association. The comparative analysis between different species highlighted novel genes associated with cuticle construction.

The second part of my work was concentrated on the integration of the data into a MySQL database. The database was designed and constructed. Additionally a Java based interface was implemented to handle and extract the data. I also tutored lab members in using the database.

In my work I was guided by bioinformaticians and computational biologists working in the Department of Plant Sciences and in the Bioinformatics and Biological Computing Unit. I never had problems contacting these people; usually a phone call was enough to solve any problem I had. All of them were very patient with me and always gave me good recommendations and advice. I enjoyed working with them a lot.

2. The Team

On the first day of my work in Dr. Aharoni's lab I received a very warm welcome and support from the whole team. Dr. Aharoni's lab has a tradition of bringing chocolate and cookies to work and eating them together during coffee breaks. In general, I learnt that people in Israel love to share food and usually it is not a problem if it is not kosher. Therefore, on the first day I was very happy to have some German chocolate with me as a gift from Germany.

The people in the lab enjoyed to teach me Hebrew and to show places around. At weekends and holidays I travelled a lot with them. It was only a three month stay, but I set foot in Tel Aviv, Jerusalem, the Dead Sea, Masada, Ein Carem, Haifa, Kibbutz Shoval, Zichron Yaakov and Eilat. I even traveled to Petra in Jordan, which is a UNESCO World Heritage and the place I wanted to visit for a long time.

Almost every week I went out for lunch or dinner with my colleagues. Sometimes Dr. Aharoni recommended us restaurants with best hummus or meat in town and usually joined us that was very nice. I am also very grateful to my colleagues for always keeping me company while I was doing sports, going to the cinema, concert halls or museums.



Petra, the world wonder and the greatest tourist attraction in Jordan.

III. Miscellaneous

1. The Language

Communication in Israel was not a problem. There are two official languages in Israel – Hebrew and Arabic. Many Israeli are also fluent in English, as many TV programs are broadcasted in this language and English is taught from the early grades in elementary schools. During my stay in Israel I wanted not only to practice my English but also to learn Hebrew. Therefore, on the campus of the Weizmann Institute I attended an Ulpan level Aleph, an intensive Hebrew course starting with no Hebrew skills. We met twice a week, 2.5 hours a day and it was great. The teacher was very motivated. We learnt how to read and write and a basic vocabulary with an emphasis on what we really needed to get around. I always tried to use a new word or phrase in my everyday life and I was even able to hold small conversations in Hebrew.

2. The Climate

Israel is located in a subtropical region. The southern and eastern areas of Israel are characterized by an arid climate. The northern and coastal regions show Mediterranean climate characterized by hot and dry summers and cool rainy winters.

Every year there are snow falls observed in Golan Heights, the northernmost part of Israel. Whereas Eilat, which is located in the southernmost point of Israel at the Red Sea, has a good climate beach holidays all year around.

3. Everyday Life

The official currency in Israel is the New Israeli Shekel or shekel for short. The foreign currency can be exchanged in Rehovot at the post office or licensed exchange offices without commission.

Driving in Israel is on the right side and it can be a challenging task for foreigners. Israeli drivers have little patience and the driving culture can be compared to the Italian one. Since Israel is such a small country it might be easier to get from one place to another in a relatively short time by public transportation. Public transportation is very convenient and it can bring you to almost any destination for a relatively low price. And there are also discounts on intercity bus lines for students. Most of the bus lines however do not run on Shabbat. The service ends on Friday afternoon and resumes on Saturday evening.

Cellular phones are in widespread use in Israel. Currently there are only two cellphone companies, Cellcom and Orange Israel. Prepaid Orange Israel SIM cards are available at supermarkets and kiosks. They are very good for local and intercity calls. However, international calls are much cheaper if using public phones that can be found on the main street of all cities (e.g. Herzl Street in Rehovot).

There is a shopping center (Canyon), a market and different shops in Rehovot that are open Sunday through Thursday between 9am and 7pm. Stores close on Friday at 2pm and some of them open again on Saturday evening. There is a non-kosher supermarket Tif-Tam, located very close to the Weizmann Institute, which is open on Saturday and works longer.