

Academic Research along with exploring the culture and history of Spain

Spain is not only a country just to explore the culture and the history but also a centre of knowledge and research. When in dark ages, education system completely collapsed, and the knowledge was lost, Spain was the centre of knowledge. In the golden ages, there were many discoveries and inventions from old Spain “Al-Andulus” which were as follows:

- Botany, study of plants: Spanish botanist such as Ibn al-Baitar created hundreds of catalogues on many plants
- First printing device in Europe was first invented in Spain 100 years ago.
- Glass mirrors were invented in 11th century in Spain.
- Pharmacopoeia: A book of medicine in the 14th century.
- Telekino, pioneering of remote control invented by an engineer and mathematician Leonardo Torres.

Above are the reasons which motivated me to research and collect some useful information about my third-year Biomedical engineering project from Spain. Therefore, I decided to find the city with the most science and history museums and I found out Barcelona has several history and science museums. Then I found out about QMUL expedition fund which helped me towards achieving this goal. This fund gave me an amazing opportunity to explore the culture and history of Spain along with completing my academic research. Not everybody gets this golden chance from their university, but if we are lucky enough to get it we should use it wisely.

My trip was for only 3 days, so I decided to visit the old city of Barcelona (Catalunya) on my day 1. This included Sagrada Familia which is a very famous Roman Catholic Church of Barcelona but unfortunately left unfinished by Catalan architect Antoni Gaudi. But it is the most visited place of Barcelona as it is devoted the Holy Family: Jesus, Mary and Joseph. Then in the evening I visited the Barcelona Cathedral which is another most frequently visited place of Barcelona with it stunning historical and architectural views from outside as well as from inside.



Figure 1 Sagrada Familia



Figure 2 Barcelona Cathedral



Fig: 3 Barcelona Cathedral

Next day, I visited the science museum which was at the very other end of the city, but it was compulsory to visit that one. It was the most crowded museum as students from many colleges and schools were already present there in groups. This museum was informative not only in engineering but also in pharmaceutical and material science. It helped me with my third-year project research which is on Zinc oxide biomineralization. Below is a picture of different minerals and materials taken from that science museum known as CosmaCaixa. It is very important to know what kind of material properties we are looking for when designing a product/prosthetic. Also, it is very important to prick a material which is biocompatible and does not cause any rejection from immune system. So, engineers or material scientists must think of a material which does not react with immune system which can only be understood by researching with different materials and minerals used in them.



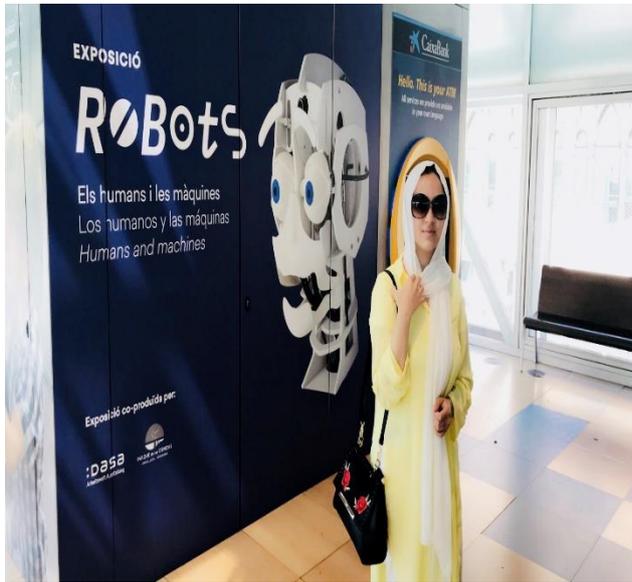
Figure: 4 Different types of minerals and fossils

This museum is also famous for the displays of discoveries and inventions of Marie Curie, a very talented physicist and chemist who conducted research on radioactivity and became successful in her research. She ended up discovering Radium and Polonium which are two important elements of periodic table. Radium is found in oil and gas industry residues so when these residues are flooded in rivers and canals, they contain this radioactive element known as radium which can badly affect not only sea life but also people's health. Charles Darwin theory books and displays were another popular part of this museum who is best known for science of evolution. Albert Einstein research displays, and theories of relativity were another astonishing part of CosmaCaixa museum. Picture of mine was taken with Marie curie (Standing

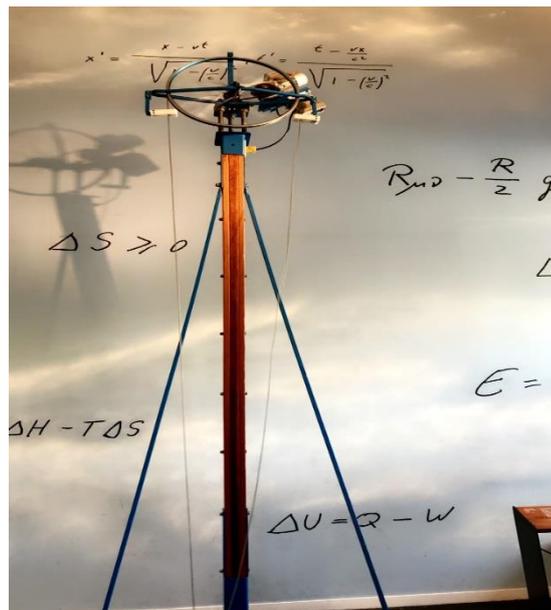


statue) with Albert Einstein and Charles Darwin sitting at the back displayed as a statue.

Another part of this day which fascinated me even more was about robotics and its research. As robotics is a major part of my third year so it added a lot to my knowledge about basic principles and disciplines of it. In our life, robots have taken a major part starting from washing machine to medical surgery in hospitals. Most of the things have been replaced by robots. In our mind robot is just a piece of art which looks like a human body, but it is not from engineering point of view. Robot is a device which assist us humans in our daily life. It could be a part of any mechanical structure which increases its efficiency and decreases its work load.



Below is the picture taken of Lariat Chain Norman Tuck 1990 displayed in Barcelona museum. It is a loop of chain which spun by a wheel developed from chain reaction by Norman Tuck. Chain reaction disrupt the motion of travelling chain and speed of the chain will be equal to wave speed of transverse waves.



Then I visited the very popular art museum of Barcelona followed by history museum of Barcelona. Art museum is also famous due to its location at the top of the city where you can stand in front of the museum and can enjoy the view of the whole city. History museum exhibits historical heritage of the city with its beautiful monuments and many astonishing art pieces.



(Note: Picture of History museum taken outside because inside camera was not allowed.)