

# **Summer internship in IBM Watson, NY**

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This report covers my own experiences and activities undertaken within my summer internship in IBM Watson Research Centre in New York, US. The main goal of the present document is to give my personal point of view of what are the main factors to take into account in order to do a summer internship in US. Additionally, I would like to include some pieces of advice collected from my stay in a recognised front-line research centre within United States.

IBM has a comprehensive programme for summer interns that can be the door of a possible future work within the company and the opportunity to work closely with an outstanding research team on challenging problems. IBM Thomas J. Watson Research Center is the headquarters for IBM Research, the largest industrial research organisation in the world, with twelve labs on six continents. Concretely I worked in the main laboratory in Yorktown Heights, New York, 38 miles north of New York City.

During the period covered by my internship I collaborated in the *Business Analytics and Mathematical Sciences* department within the *Artificial Intelligence for Optimization* group. This research group is specialised on hard combinatorial, continuous, and stochastic search problems as they arise in the context of real-world applications.

## 1 Application

I have the impression that I applied for the internship by chance, mostly because my second supervisor sent me an email with the advertisement of the position and she suggested me to apply for. I had never thought on doing something like that, perhaps because the normal working life of a PhD student is a continuous flow of research, papers, conferences and I had never stopped for five minutes to think about the possibility of performing other kind of activities.

An internship is, without any doubt, a perfect way to earn practical experience and a good element for your CV, above all if the industry is one of your possible future career paths. Furthermore, usually other interns that I got to know there, apply for summer internships every year as part of their preparation for their professional life. Some of them even repeat in the same company for more than one time.

Once I considered seriously the option of performing an internship with this group of research, the application process was, in fact, rather easy. I sent them an email expressing my interest attaching my CV, a covering letter and my recent publications. It is, of course, crucial that your supervisor supports your application and that he or she takes the time to give them good references about you in a reference letter. Apart from the engagement of your supervisor and a reasonably good CV, it is normally necessary to pass a phone interview.

In my case, in the conference call participated my future manager and some of the researchers of the group. During the interview they did not ask me a lot of technical questions, but I suspect this is not the general rule. In fact they only requested me information about my current line of research, my publications and which outcomes and benefits I expected from the internship. With this information the group could assess in which of their project I could contribute more effectively.

One question of remarkable importance in my case was the possibility of having

an external source of funding which covered part of my expenses. The possibility to apply for the Postgraduate Industry Internship Programme of SICSA was an important advantage for me to stand out from other candidates, due to the fact that the group wanted to maximise the number of students working during the summer in its group and this external funding allowed them to hire two students for this summer period. The other selected intern was a PhD student from a US university whose supervisor collaborated in the past with this group. From my point of view, the fact that perhaps it is more complicated to have overseas connections when the PhD is done in Scotland, makes the support of SICSA a fundamental factor for the success of the application.

Once they informed me that I was accepted for the position, the company sent me an invitation letter with the proposed completion dates and its monetary contribution for that period. The group was rather flexible with the exact period of time of my visit and I could change it to the dates that suited me the most. Later on, I received a legal document called Joint Study Agreement indicating me more in detail the characteristics of the internship, along with the request to create an IBM jobs account.

One of the points that unfortunately I did not pay enough attention to and I totally regretted later was to review calmly the terms of this document, above all the part related to when the company would pay me for my services. In my case, the agreement specified that all the money would be paid at the end of my internship. This point was a real disadvantage in terms of my available budget during my visit that I could have easily avoided if I had have these dollars in cash to spend during my stay in the US like in the case of others interns who received their money each week. Besides, the need to use my own money in pounds during my stay in the US increased the exchange fees that I had to pay and the fee to cash the cheque of my salary that IBM finally sent me to Scotland one month after I finished the internship.

Finally, regarding the SICSA funding, only to comment that in order to perform the formal application for this extra funding it is necessary to have a letter of support from the institution where you plan to do the internship and this means that it is not possible to know in advance if you have this budget before you apply for a given position and the institution is interested in you.

With this I concluded the application for the position phase and from there, I started with the visa request.

## **2 Visa Period.**

This was the first time in my life that I had to request a visa to enter in a country and I have to say that when I started I did not have a clear idea about the complications and the expenses of the process.

The main point that I was not really aware of was that the accomplishment of all the procedures could take an extraordinary amount of time, mainly because of the long list of requirements that is needed to be fulfilled. I remarkably recommend not to delay this process at all if you want to save money and minimise concerns and stress. Before I started with the visa I was really busy extending a conference paper to a journal paper and, because of that, I postponed a couple of weeks the starting of the bureaucracy process what I really regretted later.

Furthermore, one of the statements of the US embassy on this regard is that they strongly recommend not to book any flight and accommodation before you receive the visa confirmation from them and, in my case, I did not have any other option than to book all in advanced because, at the end, my appointment for the visa interview in the consulate was really close to my day of departure. This means that when I went to pass the interview in the consulate I was very worried about the possibility that something were wrong and they could deny or delay the process and I could lose all or part of the money invested up to this date in the internship.

During the first days that finally I could focus on the visa request I spent an unnecessary amount of time figuring out which kind of visa I should apply for and the requirements for each of them that seemed to be more appropriate in my case. In fact, the government of United States offers multiple kind of visas, some of them with very subtle differences. This search was a total waste of effort and time because when I received the official internship acceptance from IBM, they indicated me the specific visa that I required. Concretely I had to apply for the J1 Exchange Visitor visa that covers cultural and educational exchange opportunities in the United States.

However, one important requirement that you can manage in advance is to check the date of renewal of your passport because it should be valid for at least six months beyond the date of admission in the country and in the case you do not meet this requirement you can renew it before you start with the rest of documents.

Regarding the case of the J1 Exchange Visitor visa request, the organisation where the internship is going to take place should first apply for the DS-2019 form. The DS-2019 is the certificate of eligibility for exchange visitors. In order to do this, the organisation will require from you some documents that you should provide them like a complete CV, education credentials and so on. The more important requirement is a proper health insurance coverage which has to meet the requirements for a J1 visa health insurance.

A health insurance coverage for this period of time is rather expensive and I highly recommend to try to be paid by your own University. In my case, Heriot-Watt accepted to pay me the coverage but it requested me to know in advanced if SICSA had accepted my application of extra funding which caused me a noticeable delay in the visa application.

The J1 Exchange Visitor visa allows you to be in the United States 30 days before work begins and up to 30 days following your work assignment so you will want coverage during the extra period that you take to prepare your internship and perhaps to do sightseeing.

Once the complete list of documents was sent to IBM, they arranged my visa package. I have to admit that I was very naive because, at the beginning, I thought that the DS-2019 form was the complete visa, but unfortunately it was only one of the requirements. Receiving this form as soon as you can is very convenient because unfortunately you cannot ask for an appointment at the U.S. Consulate until you have received the DS-2019 form. You need to present it along with the \$180 USD SEVIS confirmation fee when you attend your visa interview. This document is as well important because you need to bring it with you when you travel to the US like in the case of the health insurance.

Once you receive the DS-2019 form, you need to call the consulate to schedule the

interview. Unfortunately the United States Consulate General in Edinburgh does not process visas and cannot answer any questions concerning visa services. Visa processing in UK takes place only at the Embassy in London and the Consulate General in Belfast.

Be aware that calling the Embassy, even within the same country, is rather expensive. They charge you at £1.23 per minute plus network extras and you need to spend a noticeable amount of time at the phone. Apart from that, you cannot contact them to request information by email neither using any normal land line. Consequently it is better to try to find the information from other sources. The London consulate web page and other American web sites can give you all the information that you need. The problem is that the amount of content that you can find is sometimes overwhelming and it could be a little bit confusing. If you have further doubts I recommend you that you address your questions to the company where you are going to work on. They, in general, have a clear idea about all the process and can perfectly guide you.

In the telephone call they are going to request you some personal data. Apart from that, you need to pay at this moment the DS-160 Visa Application Processing fee which is approximately \$131 USD. Then, prepare the credit/debit card before you call them. Finally you have to answer an easy security questionnaire. When they collect all the information needed, they will let you know when is the closest day that you can choose for the interview in the embassy. After that, you need to complete the online visa application and print the form confirmation to bring it to the interview.

The majority of people chooses London as a preferred place to pass the interview. However you can expect that the appointment is scheduled in more than one month from the day you call the embassy and, later, you should wait around two weeks to receive your visa by mail. On the other hand if you choose Belfast, they could normally arrange your interview in a considerable less amount of time and you could receive your passport with your visa at home in less than a week. This was the reason why I chose to go to Belfast.

Unfortunately as you do not know the exact date for the interview until you call, you cannot book the flights, train or buses to go there with a lot of time in advance. Consequently the prices of the tickets such close in time could be as well rather expensive. One important issue here is that if you want to come back home from the interview flying, remember that the consulate keeps your passport for some days and, consequently, you need to take another document to identify yourself at the airport.

Another point is that if you arrive late to the interview, it is automatically cancelled and you need to call again to the same number to arrange the interview another day what could cost you extra money. Due to the fact that my interview was arranged very early in the morning, the fear to arrive late made me spend the night before in Belfast and spent an additional amount of money in an accommodation close to the consulate. If you decide to go to Belfast be aware that the consulate is located within a private flat development with no information shown on the main door and within an area not very populated. If you miss the entrance it could be complicated to find somebody to ask in the surroundings.

In the same line, if you are there on time but you miss to bring with you any of the required documents, you need as well to rearrange the interview again and come back to the consulate another day. Then, I recommend to be careful. The interview in

Belfast, at the end, was rather relaxing. Everybody who I spoke to there were people going to US for non-immigrant purposes, requesting the same type of visa like me. Then I suppose that the questions and the procedures, in this case, were not very hard to pass.

The interview was composed by two parts. In the first one, you need to provide them all the documents and let them take your digital fingerprint scans. In the second part is where you need to answer a bunch of questions about your stay in US, your financial resources, the selected accommodation and some characteristics of the position you are going to take. With all of this data, the consular officer should determine whether you are qualified to receive a visa. In the affirmative case, in some days you will receive your passport with it by mail.

### **3 Arrival**

When you arrive to the US you have to pass an immigration inspection at the airport. Normally the queues are very long and you can expect to wait more than one hour until an immigration officer inspects your documents and makes a determination whether to admit you into the US in J-1 student status. Be prepared to present the following documents to the US Customs and Border Protection officer:

- Passport with a valid non-immigrant visa.
- Original form DS-2019.
- Receipt verifying SEVIS fee payment.
- Evidence of financial resources. In my case this point was specified in the DS-2019 form.

The officer will also process the I-94 form what is called the Arrival-Departure Record that you have previously to fill in. Immigration services uses this form to track foreign citizens' arrival into the US. This form is very important because it allows you to apply for a Social Security Number what and receive your payment. Finally, the form must be surrendered when you leave the US. In my case the officer stapled the form to my visa and I did not have to worry more.

Once the officer let you in, you can go to pick up your luggage. Before you leave the airport it is possible that another officer wants to inspect the content of your belongings. Be aware that if you bring with you any kind of food, even a chocolate bar, they possibly will require to open and check your bags.

In New York city, there are three main airports. The John F. Kennedy International Airport, which is the biggest and the most crowded, LaGuardia Airport that mainly handles domestic flights (both airports are located in Queens) and finally, Newark International Airport, in Newark, New Jersey, which handles both domestic and international flights and it is much more relaxing in terms of people and facilities but further from the city centre.

If you decide to take a taxi, be aware that there are different types. The very famous official yellow cabs whose fares are based on meters that measure distance and time.

You should pay only what is on the meter, plus a 15-20 percent gratuity. If you do not pay the gratuity or only an small amount like in my case, the driver will be very disappointed. There are additional charges for crossings outside the metropolitan area and New Jersey or if you go from/to any of the airports.

There are other type of cabs and limos that you can pre-arrange. According to my personal experience, in some of them you can make a price agreement to get to your final destination in advance. Avoiding to pay by the ride time could be in sometimes better because of the common traffic congestions in the city. Something that drew my attention was that taxis not necessarily have to know the way to your destination. This means that in my first ride we had to guide the taxi driver to the hotel where we spent the first night using our mobile navigation program.

If you choose to take the public transport in New York city, you have to be aware that in the case of the subway, in general there is a complete lack of escalators and lifts and you have to carry your luggage ups and downs through some stairs. If you bring heavy luggages it could be very challenging to arrive to your final destination. It is as well important to pay extra attention to the train that you take, because at the beginning it can be a little bit confusing to distinguish between the local and express services and to understand correctly the different signs used to guide you. I did not take any bus carrying big luggages with me, but during the time I took the bus daily I have never seen somebody with big bulks inside, then in the case you want to use a bus service you arrive to your final destination, I recommend you to check if this is allowed.

You can buy a single ride or a 7 day metrocards in the machines at any subway station in cash or with a credit card. Once you enter in the subway, it cannot be used again for 17 minutes. Then be careful if you enter in the subway in the wrong side of the platform. Sometimes the only way to change it is going out from the subway and trying to enter again through the proper entrance. However, if you do not let pass this 17 minutes without trying to enter again, the metrocard is not going to allow you to enter and if you try to pass through the door security at this moment, the subway officer can be extremely rude and I do not recommend to anybody to have this experience.

## **4 Find an accommodation**

It is a common practise that your institution offers you an accommodation whose rent can be covered by your internship programme. However, if your institution is not located within the city centre, be careful and check the availability of public transport. Perhaps the place offered to you could be not the most convenient and comfortable if you want to have a normal life during these months.

For example, IBM has a deal with a motel that it is located in the middle of nowhere. Interns who decided to live there told me that when they needed to buy food or take the only bus to the next small village, they must necessarily cross a very busy highway without any pedestrian pass-away what it is actually really dangerous. Apart from that, this particular place did not offer dinner services, providing only a microwave. Some of them complained as well about that they felt rather isolated and suffered from homesickness above all at weekends.

Personally I recommend to avoid these kind of accommodations where it is com-

plicated to know people out of your research environment and try, perhaps, any of the web pages which offers rooms to share. I personally support the idea that when you go to another continent you should get involved in the culture of the area and not be restricted only to your project, area of research or company. If you choose to share a house or flat you could enlarge the likelihood of knowing people with multicultural backgrounds and be able to absorb much more about the culture of US and the people living within it. However I have to say that the prices of a single room are very expensive. It is really complicated to find something below \$900-1000 per month and normal prices can be even higher.

In order to choose a good place, the transportation could be really an issue. Outside the big cities, the arrangement of urban areas are rather scattered and almost all the services are conceived to be visited by car. The majority of people in US use cars to go to almost everywhere and it is really crucial to check in advance if you really have a public transport or you are in a walking distance to all your basic necessities. This perhaps could seem odd but at the beginning I did not know where the closest supermarket at a walking distance was.

## **5 Style of life**

One thing that I realised during these months was that it is really different to live in New York city than in the outskirts. I consider New York city rather close to the European way of life. During my two first weeks that I spent in New York city, concretely in Brooklyn, I did not feel any crash of cultures and, in general, all was rather familiar to me. Perhaps, it contributes as well that I got born in a rather populated city and, due to that I got used to the hectic life and amount of people of NY city very soon. However this can be an issue for some people.

In general, the people of New York city were rather diverse and friendly in general, above all if we take into account that they have to interact with this amount of people everyday. It is worthy to mention that I found a huge community with centre and south American roots living there, who speaks Spanish all the time. I have already known that US has a big Latin population, but I did not suspect that it was so big. I cannot complain, as a Spanish native speaker this factor contributed to strengthened common links with part of the New York culture.

Another interesting aspect that I could mention is that I did not have the impression that the city was especially dangerous at any time. I came with a lot of prejudices on this regard, perhaps because of the image taken from the American movies, but I discovered that it was wrong, at least in the areas I visited. The driving style is as well radically different, you can consider that drivers in the entire city are a little bit crazy compared to Edinburgh, for example.

On the other hand, when I moved only some miles away north from the city, the reality was rather different in several aspects. I lived in the Westchester county which was connected to Central Station (Manhattan) by Metro North line in a trip that last less than 45 minutes. There, I could experiment more the typical American way of life. My accommodation was a top-floor room in a cosy wooden detached house. The area was incredibly green, full of scattered wonderful houses, including a huge dog cemetery. The urban areas that surround my final accommodation had a very small city centre



where was concentrated a bunch of restaurants and pubs.

My landlord, with an Italian background, rents some bedrooms to students and interns. There I had the opportunity to know very varied people like a Mormon from Ohio and some girls from Korean, Morocco and Saudi Arabia. In general people were really warm and friendly and the feeling of safety was stronger than in the city. For example, in general my landlord left the side door open during all the morning.

The different role of cars and public transport in the arrangement of the city makes the location of some services rather inaccessible if you do not have a car. Most of the supermarkets were placed outside the urban area, in big warehouses (what personally reminds me on industrial areas) and, at the beginning, it was complicated to know where were the best places to buy food and other necessary things. When you get close to this part of the city, you realise that the pavement areas for pedestrians are scarce and sometimes even disappear completely what makes it even more complicated to get there walking.

Inside the supermarkets, my personal impression was that the range of products was more varied than here in Scotland, above all the part related to fresh vegetables and fruits and they were much more tasteful. My landlord told me that in this county in particular, Westchester, the prices are very high and, from this perspective and even with the advantage of the pound as a currency, food seemed to me quite expensive. However, perhaps this perception cannot be generalised to other areas. Public transport was as well more expensive than here in Scotland and, one clear difference was that, compared to Scotland it was used mainly by minority ethnics.

If you plan to go to any kind of restaurant, you can see in the menu that all the main and side dishes have its corresponding total amount of calories what sometimes really could refrain you from eating some kind of food. Remember as well that the gratuity that you should pay is around 20% of the final price of the order. Another curious point is that almost everybody asks for a doggy bag to take the remains of the food and definitely not to give it to the dog. One of the reasons of that is that normally the size of the portions are bigger than here, but I saw people taking home only a single portion of a whole pizza.

Finally, remember that you should add a what is called *sale taxes* on every purchase item. This tax is not marked in the label or menu, but it is added when you finally pay. The percentage is decided by the local government, then the same merchandise may have a different tax and thus different total cost in one city over another.

## **6 Work in IBM**

The IBM Thomas J. Watson Research Center is a large crescent-shaped structure of three floors where none of the offices have windows. I have to say that, even if the views from main corridors through a huge forest are stunning, when you work there, the total lack of natural light throughout the day and the small size of the offices, make this building not the best place to work and this impression should be even deeper in winter time.

The facilities of IBM in Yorktown are literally in the middle of nowhere, further

from any urban area. Unfortunately, there is no public transport giving service to there or to the surrounding area that workers could use to reach their jobs. The only non-corporative way to reach the offices was paying a taxi. During the summer period, however, IBM supplies a shuttle service from one of the biggest villages close to the office to bring interns to the facility. The service runs only in summer, and if somebody arranges the internship outside this period, there is no way to go there without a car. I personally had this problem during my last week there and it was very inconvenient and embarrassing to have to ask everyday if somebody could let me close to any bus stop. My personal advise about that point is that you never should take for granted the existence of transport services to your institution in the case it is located out of any urban area. The use of cars is so general there that the companies do not need always to offer this kind of services.

During the two weeks previous to the official beginning of the internship, I requested to my future manager to have some initial reading material to minimise the time that I could need to familiarize with some of the current research topics of the group. I was there for only two months and the two weeks of preparation were rather useful even if I combined part of the time with doing sightseeing in New York city. In longer internships perhaps this is not a crucial requirement, but if you want to do something useful in a short amount of time, it is better to be familiar with the projects and techniques as soon as possible.

At this point I want to highlight two major points that I could draw as a conclusion of this working period. First of all, for short-term internships as mine, it is much better to select a group of research who really works in your same topic. In my case I chose a group specialised in optimisation from the operational research perspective. They mainly investigate using statistical and exact methods and, in my case, my expertise is more focused on Artificial Intelligence concretely in meta-heuristics. Before the internship I thought on this aspect as an advantage which could make my profile more flexible, but later I regretted it.

Of course, both fields overlap their areas of influence but, as my technical background is not really the same, I could not contribute in the discussions as much as I could have done if the topic would have been more familiar to me. Furthermore, the impressions of the group regarding the intern sometimes are rather influenced by the verbal expertise that the intern could show in these talks, above all in short periods of time, where it is hard to achieve comprehensive results which support you as a good researcher.

On the contrary, I had the opportunity to speak to interns whose PhD topics were actually the same than the project that they were assigned to. In general they told me that, among other advantages, they felt more confident, they could minimise the time devoted to the preparation and understanding of the assigned tasks and, also, they were able to take advantage of the work done there to develop some extensions to incorporate in their own PhD project at the same time.

For most of the people who applied there for an internship, the main personal incentive was to be selected as a proper candidate to work into the company when he or she finishes the PhD. From this perspective, what it is expected implicitly from an intern who wants to be a possible candidate to enter in the company is that he works as much as possible in order to provide good results and impress the assigned manager in order to receive in exchange a positive feedback and references. Subsequently it was very

normal that interns spent most of his time, including evenings and weekends, working. Of course, this was not mandatory but, perhaps if you work only your eight hours per day, you could have more problems in order to be perceived as a proper candidate for the future available positions.

Other possible goals to achieve within the internship are to develop something enough innovative to be able to publish a paper in a journal or conference and develop some links of cooperation between the University and the institution. To achieve these goals I think it is not required to work until exhaustion.

Secondly, another crucial point that I highly recommend is, if you have influence in this decision, to choose very careful the person who you are going to directly depend on and the project you will get involved in, above all if your stay in the company lasts only for a short period of time. Regarding the expertise, if you can minimise the time required to get familiar to this particular project you want to contribute would be very positive. Besides if you can check that the final goal that you want to achieve is reasonably fulfilled in this period of time, could be more likely and easier that you finish doing something worthy. From my personal point of view I have the opinion that it is always better to complete the tasks, even if they are more modest, than let them unfinished.

According to the person who you directly depend on, one mistake that I made was to select a project where the person in charge, in this case the manager of the group, went on holidays for three weeks during my internship.

When they finally decided in which project I could contribute the most I spend the first week reading more papers and trying to understand their way of working. At the end of this week my manager held a meeting with me where he explained me in more detail what he had in mind in order to improve a particular step in an algorithm. I tried to pay attention and absorb all the information I could. This day he left the US for three weeks with the requirement of avoiding any possible email communications. During the next three weeks, me and the rest of the team made the best to figure out if what I understood and the approach that I was developing to solve this particular problem were properly in line with the idea of my manager.

Unfortunately, even though I presented my work several times during these first weeks to other members of the group, when my manager finally returned from holidays he pointed out that he was not really interested in my approach and this led me no other option than to start from scratch again one month before my internship was concluded. Unfortunately, this fact restricted even more the final results that I could develop.

Finally it is perhaps worthy to mention another aspect in order to understand the different point of view of working in US and in Europe. According to my personal experience there, the environment among people is definitely more competitive and I want to clarify what I mean exactly with "more competitive". During the time I spent there I had the impression that you continuously need to demonstrate how smart you are. Employees are measured by how intelligent they are. I felt several times during lunch time where different people from different groups join together, a race between them in order to be the best, avoiding to show any weakness like asking a technical question about any not completely understood point of the discussion. Personally I felt not very comfortable with this approach because I always prefer a place defined by cooperation rather than by competitiveness, but this is a personality matter.

As a conclusion I would like to mention that even if at the end I my final results in IBM were not as fruitful as I would have liked, the whole stay in the US was totally enriching and I absolutely encourage people to get involved in such a rewarding experience as I was not only able to learn new things but gained new friends. Definitely it is worth of repeating.