

# CERN Spring Campus

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## Activities Report

**Abstract**—This report describes the journey I took for three days in IST Alameda, Lisbon at CERN Spring Campus event. It illustrates how the lectures were presented and what the event offered to their participants, bringing together experts from around CERN to meet with future engineers and scientists. We were presented with topics from different areas from physics, mathematics to informatics in the form of slide presentations along with precise explanations on the topics as well as social events. By the end of it we left enriched with new knowledge on important topics and new market trends. On the market today, knowledge is very valuable to companies and events like these provide some that can't be achieved nowhere else.

**Index Terms**—CERN, IST, Information technology, Science, Physics.

## 1 INTRODUCTION

THIS journey started 1st April When I traveled all the way to Instituto Superior Técnico (IST) Alameda in the center of Lisbon to learn more about European Organization for Nuclear Research (CERN), with such reputation behind this organization could only be a great learning experience.

This report is simply a description of the event that consisted in 3 days of presentations as well as social and scientific activities with specialists from CERN, focusing on Information Technologies and Computing. It is separated in sections for better clarity and readability.

I joined this event with the goal of have a better understanding of their organization as well as develop myself for the future. This was limited by the schedule of the social activities that weren't compatible with my responsibilities.

Events like these should not be taken lightly due to their rarity and the importance they can have, this importance is derived from the knowledge and information to be gained there that can't be achieved most likely elsewhere.

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## 2 DAY ONE

The first day of the journey started at 8 am. The distribution of the Identity document (ID) to the attenders along with some other support materials was the marking of it.

Everybody, including me, was ready and waiting, looking forward to the lectures start and to meet these incredible scientists and engineers from CERN.

### 2.1 Lectures

Lectures were initiated with a coding competition introduction, Grid Wars, that was taking place throughout the event. It consisted in developing a java automated player for a war simulation game with a prize pool for the best three teams of developers.

The following lecture was more educational it was about the use of big data in research projects with focus on CERN. Just before the coffee break the lecture was about agile development with Kanban, nothing new to most IST students present as it lectured in our course but nonetheless important due to its focus nowadays. Only difference was the use of this Kanban techniques they use at CERN which basically consist in the use of a visual board as the meaning of "kanban" in Japanese. Coffee break passed, the lecture following was

(1.0) Excellent	ACTIVITY						DOCUMENT						
(0.8) Very Good	Object × 2	Opt × 1	Exec × 4	Summ × .5	Concl × .5	SCORE	Struct × .25	Orgn × .25	Exec × 4	Form × .25	Titles × .5	File × .5	SCORE
(0.6) Good	1.0	1.0	1.0	1.0	0.8		1.0	0.8	1.0	1.0	0.8	0.8	
(0.4) Fair													
(0.2) Weak													

the first of its kind, physics. It was about colliding protons, something CERN its specialized on, the reason for it, the results and how to measure them.

Last lecture of the morning, Cloud computing, the topics here; importance of the cloud, how can it be improved, how its being used, were really interesting specially in this era where cloud is so heavily focused.

Lunch passed by, back to lectures, the first was about Web application security, again to a IST student nothing new in the topics discussed however their main focus was on importance of security and how can we improve it, which are interesting anyway.

Lectures itself were finished for today, at least informational ones. The following two were about companies from ex-CERN members, Webdetails and Unbabel. Very different from each other, Webdetails focus more on big data and information management while Unbabel is a translation company based on artificial intelligence, however with one thing in common both started as startups from young CERN members.

## 2.2 Social Event

After a long day of lectures, as it was the first day, and we didn't know each other very much, there was a dinner after. It took place at IST Alameda, not everyone went, as it was optional, but there were still a good number of attenders.

We got to know each other a little better, talk with CERN representatives and learn more about not only what was lectured and CERN itself but personal tastes and the most important make new friends.

Night was upon us, and tomorrow was a long day so we called it the night and went home, after only a few drinks after dinner.

## 3 DAY TWO

Second day had come upon us, we now knew more what to expect from it nothing like the first one where it was all unknown. However expectations were still very high from the stunning first day and the schedule was terrific.

So it started a bit later than last one, 8.30am this time. Without reception today started straight to a lecture.

### 3.1 Lectures

The theme was again agile development on this first lecture, but not Kanban, this time the focus was shifted to something very familiar to IST students, Git, a software we use on a daily basis. The lecture also explained a little about the famous CERN accelerator, Large Hadron Collider (LHC).

The second lecture was about database distributed transactions, a very interesting topic for those who focus on distributed services, and there were many.

Coffee brake was fantastic, but the lectures continued, Big data part two, the continuation of the first Big data lecture of day one, such topic could never be addressed in such little time. This second time, the lecturer focus was mainly on how this Big data concept is used at their research projects at CERN.

The lecture before lunch was about Openstack, it consist of a free and open-source cloud computing software platform. The technology consists of a series of interrelated projects that control pools of processing, storage, and networking resources throughout a data center. It is used widely at CERN.

After lunch, we started with a High Availability Service lecture, again a topic from distributed services, was a very light approach on the topic, mainly only importance and how its achieved but without getting into great detail. It was followed by one of the greatest lectures, the presentation was about the Groovy language. It is an object-oriented programming language for the Java platform. It is a dynamic language with features similar to those of Python, Ruby, Perl, and Smalltalk. The lecturer made a great job reaching out to the attenders by the end of it everyone was curious to try it.

The second lecture of physics was about trigger systems, most specially trigger systems for the LHC, In particle physics, a trigger is a system that uses simple criteria to rapidly decide which events in a particle detector to keep

when only a small fraction of the total can be recorded. He explained how these are built, programmed and chosen for each chamber of the LHC.

Last lecture of the day, Spring Framework, it is an application framework and inversion of control container for the Java platform. The framework's core features can be used by any Java application, but there are extensions for building web applications on top of the Java platform. Not new to many, but still interesting to hear their opinion on it.

## 4 DAY THREE

Two days had already passed, was incredible how fast it went by, time does fly. Day three started at 8.30am like the previous but this one was far longer due to its social event.

### 4.1 Lectures

Distributed transactions and Bitcoin was the first lecture, however, he skipped distributed transactions and gave one of the most interesting and interactive lectures about money and Bitcoins. Bitcoin is a online crypt coin that works on a peer-to-peer system.

Second lecture explained how CERN analyze their databases without SQL, of a special importance due to their massive databases as they have thousands of staff and visitors. It was followed by a soft-skills presentation, focused on Soft Skills for Software Developers. "Anyone can learn to code, but being a successful engineer requires more than mastering the language of machines, you must also be fluent in human needs." [1] this was surprisingly good and helpful in a career perspective.

Next presentation was also about soft skills, Professionalizing Your Job Seeking Experience, a person from human resources department of CERN was presenting. He gave out tips and "tricks" to improve Curriculum vitae (CV) and interviews when job seeking and explained the need of "selling ourselves" specially to someone who might not even understand what we are good on, with himself as an example PhD in geology he interviews physicians, engineers, any kind of scientist or even a fireman to work

on CERN and he doesn't necessarily understand their position there. Incredible presentation.

After lunch, Code it, Break it, Fix it and Log it! a presentation on the importance of logging events and how most of the time, stuff just doesn't work at a first try. Nothing new to a IST student again, we are more then aware of that, at least we should be by now.

Following, The Art of Mocking, mock objects are simulated objects that mimic the behavior of real objects in controlled ways. The use of this, unitary tests. Most there had already used this, as it has a great use in programming nonetheless great to hear his intake on the subject. Next presentation was very connected to the previous as well as to the Grovy one the previous day, Language Oriented Programming. Nothing really new here, just a very general explanation of the uses of object oriented languages over others.

Last lecture of the event was about Javascript, the number one growing programming language, their great uses, history and maybe even its future, at least how its expected. Was also awarded the prizes for the coding competition Grid Wars.

### 4.2 Social Event

The biggest social event was in the last night, dinner at museu da cerveja in Terreiro do Paço, Lisbon. Most attenders of the event also attended the dinner, not like the first one.

We met at 8.30pm there, had a great time dinnering, talking, partying... We ended up finishing the night at a bar near by. Friends were made, a good time without doubt.

## 5 DAY FOUR

It was a special day. Actually it was only a morning, nothing like the others, day four was spent outside IST Alameda conference room. CERN Spring Campus team prepared a special event, no physics, mathematics or anything related it was a social event.

The attenders that chose so, since it was optional, and all the CERN team went together to Belém, a parish in Lisbon known to tourists

for their pastry and historical monuments.

As everyone that cross his path with Belém, we had to eat some of the famous Pastéis de Belém in their official bakery near Mosteiro dos Jerónimos. They were quite delicious in fact making our breakfast perfect.

After, we visited Torre de Belém, shown in the Figure 1. It's a Portuguese national monument on the right side of the river Tejo, not very far from the cafe we had breakfast. A very beautiful fortified tower, considered since 1983 World Heritage.



Figure 1. Torre de Belém.

After the visit, the event came to an end, not only the social event but the whole CERN Campus Spring.

## 6 CONCLUSION

The activity was a success in my eyes, not only I made new friends, met nice people, I also learned very different information in a panoply of interest areas from physics to computing.

Also I think I fulfilled the objectives the course has set for these kind of activities, as well as the objectives I had set for myself going into this. Developing myself being one of them.

CERN Spring Campus is a wonderful initiative from CERN that I would love to see realized by more institutes of their kind. It helps developing better scientists and engineers, specially more informed ones in a time that the market is so demanding and fierce it is from extreme importance having this kind of assistance.

## ACKNOWLEDGMENTS

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## REFERENCES

- [1] A. Selassie, *Soft Skills - Software Engineers and others*, 2008.

## APPENDIX DIPLOMA



### CERN SPRING CAMPUS DIPLOMA

This certifies that

**Ivo PINTO**

has completed the course of study during the 2015 CERN Spring Campus.  
The program consists of 25 hours of lectures held over 3 days.



The 2015 CERN Spring Campus was jointly organized by the European Organization for Nuclear Research (CERN), Geneva, Switzerland and The Instituto Superior Técnico, Lisbon, Portugal.

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