

CERN Spring Campus

What course? Filipe Guerreiro
Activities Report

Abstract—The challenge of this course consisted in the enrollment of an extracurricular activity with the aim of developing *soft-skills* transversal to the knowledge acquired in the rest of our courses. For my chosen activity, I decided to take part in **CERN Spring Campus** - a rare opportunity to learn and come into contact with incredibly talented and motivated people with a lot of knowledge and experience to share. Throughout the days of the 1st until the 3rd of April, I attended the lectures provided by the people of Conseil Européen pour la Recherche Nucléaire (CERN) hosted at the Instituto Superior Técnico (IST) - Alameda campus.

This is not an abstract of the document!

Index Terms—CERN, LHC, Physics, IT, Technology, Lecture.

1 INTRODUCTION

WITH this report, I intend to elaborate on the subject of study for the **Portfólio Pessoal IV**, and share the experiences I had while attending **CERN Spring Campus**. This activity led me to meeting some of the smartest people on the planet dealing with the most interesting challenges in physics and technology of today.

2 OVERVIEW OF THE EVENT

The event consisted of an intensive three days of lectures hosted at the Alameda campus of IST.

Each day of the event, we would start at 8:30 in the morning, and follow that up with a series of lectures and breaks throughout the day.

Each lecture would last around one hour, with time for questions afterwards with varying lengths depending on interest. After every two lectures there would be a break in the form of a coffee break or lunch break, where we had the opportunity to get to know and ask more detailed questions to every lecturer.

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3 SCHEDULE

3.1 Day 1

In the first day, after being a student at IST for 4 years, I entered the Alameda campus for the first time. Consequently, I saw girls the first time in 4 years.

After a welcoming speech from the president of IST - **Arlindo Oliveira**, we were introduced to an overview of CERN, its history, goals and generally, how great it is.

The first lecture was about **Big Data**, and in CERN's case, managing the massive amount of information generated on each run of the Large Hadron Collider (LHC) experiment and what are the technologies used to deal with that problem.

The second lesson dealt with agile development methodologies and more specifically, how **KanBan** was used in the software development group at CERN. After this was finally lunch time, but unfortunately, there was no vegan option available. Lunch time was a great time to get in contact with the hosts and lecturers; they were always very friendly and open to conversations by the students, which was very encouraging.

Next, we had the much anticipated physics lesson, and got a more detailed look on the purpose of the LHC and how it works.

From there, we took an introduction to **Cloud Computing**, what it is, how it came about,

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what are some of the variants, and how and why CERN is using it.

After this was a small coffee break, where I got the chance to join a group chat, where we discussed in more detail some of the topics of the lectures and also inquired about the working life at CERN, and some recent challenges they had tackled.

The day was still not over however, starting again with a overview of the most common form of attacks in the web today, from *SQL Injection* to Cross Site Scripting (XSS), giving us some general advice on the main things to look out for and how to protect the applications we build.

Lastly, but certainly by no means least, we had two lectures from guest speakers (and they were, in different ways, the best public speakers I've heard in my life) about their experiences working in startups. The first of these - **Pedro Martins** came to share how he came to be where he is today, working from **WebDetails** to **Pentaho** to **Hitachi**.

The last speaker of the day - **Pedro Vasco** was also the one that drew the most interest and questions from the students, speaking about his experience from working at **Google** to creating and failing startups, until creating **Unbabel**, a startup he started from Portugal.

3.2 Day 2

On the second day, I arrived a little late because of the strike going on with the train, but still managed to catch the first lecture of the day about more agile development tools, like **JIRA**, **Git** and **Jenkins** and how they use these in their facilities.

The second lecture was much lighter, brushing the topic of relational databases and distributed transactions, much of which we had seen on our database courses at IST.

After the coffee break, we had the opportunity to listen to the continuation of the lecture on **Big Data**, dealing with more advanced aspects of content distribution on distributed systems. The following lecture dealt with the Cloud-platform **OpenStack**, which explained the history of it, the different versions and plugins, and how CERN's customized version differs to

serve their goals.

Unfortunately, I did not mingle during lunch time, instead choosing to take a stroll to get to know the campus a little bit.

Next, we had a lecture on how to get high-availability on critical systems like the Technical Infrastructure Monitoring (TIM) system at CERN, what are some of its challenges and characteristics.

Before the next big lecture, we had an introduction to the **Groovy** language, how it came about, how to set it up, and what are some of its advantages to regular *Java*. The second to last lecture of the day was another interesting physics one, where we heard about how the LHC picks the interesting collisions, and also what are some of the different components of the machine and how it is being upgraded at the moment to increase the amount of collisions and results obtained.

To finish this second day off, we took a look at the **Spring Framework** and how it became the foundation for the *Java EE* and *.NET* frameworks, and also the fundamental features of it, like the *Dependency Injection* and the Inversion of Control (IoC).

3.3 Day 3

The final day coincided with the day Christ died apparently, which meant the roads were quiet in Lisbon, allowing for a smooth and quick ride to the campus.

The first presentation of the day was one of the most interesting, which allowed me to finally understand what **Bitcoin** is, who created it and how it works.

Next, we had a look into **NoSQL** and some of the solutions based on it like *ElasticSearch* and *Hazelcast*. After the coffee-break, we had two refreshing less-technical lectures. The first of these dealt with what **soft-skills** are required in software development, like what is required to work in a team.

The second of these was about what to do when looking for a job or building a Curriculum Vitae (CV), which was extremely interesting to most of the audience as well as me, since those are the next steps everyone is going to be taking in the extremely close future.

After lunch, we entered into our second half of the final day of lectures, which had the theme of code testing.

Firstly, we spoke about the importance of **Logging**, and what are some common frameworks in use.

The second one discussed **Unit Testing** and **Mocking**, and what are some common frameworks that are easy to use and can be used in our projects to test our code correctly and without much trouble.

Finally, our last two lectures were about languages.

The first lecture dealt with the very specific theme of Language Oriented Programming (LOP) and how it can be used to make programs smaller and more client-friendly.

The second, and very last lecture of the event was hosted by the event's coordinator - **João Silva**, which dealt with the history of **JavaScript** and how it evolved to become the de-facto standard for writing web applications.

4 CONCLUSION

The 2015 CERN Spring Campus is the second edition of a series of international schools dedicated to Information Technology and Computing.

Over 3 intensive days, I had the opportunity to listen, meet and talk to some of the most interesting people on the planet, doing incredible work that supports the most significant scientific breakthroughs in recent history.

This exchange allowed me to gain more knowledge and renewed motivation and passion about my chosen profession as I am about to embark on the first moments of my professional life. It also allowed me to become more aware of the difficulties faced every day with being at the very fringe of technological and scientific development and made me excited to think what things can be accomplished when so many smart people come together to work towards a common goal.

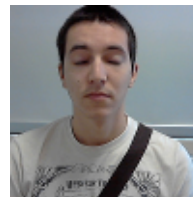
ACKNOWLEDGMENTS

The author would like to thank Mr. João Silva for allowing me to participate even though I was extremely late, and also for organizing this

great event.

The author would also like to thank all of the speakers involved, for being patient and welcoming to my questions and sharing their busy time with me.

Finally, the author would like to thank the Coaching Team 6 for the way they handled and addressed all my issues and for facilitating a smooth experience for both me and the organization.



Filipe Miguel Guerreiro Here I am. I am pursuing my Engineering studies at IST.

APPENDIX

STATEMENTS OF EXECUTION



CERN SPRING CAMPUS DIPLOMA

This certifies that

Filipe GUERREIRO

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 T cnico, Lisbon, Portugal.

Derek Mathieson
Director, CERN Spring Campus
8th April 2015