

CERN Spring Campus

Ivo Lopes

Learnings Report

Abstract—This report provides a description of enriching experiences and learning's from the Portfolio activity of the author. All of these are based on true facts and their origin is best described in the activity report of this same topic. The report will focus on what the author considered most critical from technical knowledge to personal, divided into sections to provide a clear structure.

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

1 INTRODUCTION

YOU have probably heard the famous and old quote "Knowledge is Power", this is probably the truest phrase ever said by Man. However not very many people truly understand its meaning and the true power of knowledge. Knowledge is what allowed us to drive cars instead of walk, Fly out of the Earth, build skyscrapers as well as all the other amazing achievements by mankind.

But attached to any great thing there's a catch, and knowledge isn't different. Knowledge itself is very difficult to obtain, not all of course but specifics can be a hard thing to find. This journey was all about that, a search for knowledge without doubt.

This report will narrate some of the knowledge acquired during my stay at the event granted to me by the Portfolio activity and its importance not only in a career viewpoint but also a character viewpoint. It will also aims to express the importance of knowledge and learning's.

2 PHYSICS

Physics... What is Physics?

The dictionary tell us that physics is "the study of matter, energy and the interaction between

them", but that begs the question "what is matter?" or "what is energy?". Physics as one of the oldest academic disciplines, perhaps even the oldest of them all try's to answer these questions on a daily basis over the last two millennia.

For many of the average citizen physics is just a useless science that study some theoretical concepts and form crazy theories that never come to life. This, luckily for us, does not constitute a truth. Classical to Modern physicians have worked to change life the way we know it. The understanding of electromagnetism, nuclear physics or even the little understanding we have about gravity led to great world development and industrialization such as the appearing of television, computers, nuclear weapons and many many others.

European Organization for Nuclear Research (CERN) is the biggest particle physics laboratory in the world, in a northwest suburb of Geneva, Switzerland. It's the home of thousands of physicians, mathematicians, engineers, researchers... It basically constitutes the dream of many but unfortunately becomes only the truth of some. To work in such a prestigious enterprise on the edge of world development is an opportunity only granted to the best in their respective areas but CERN now provides this Spring Campus in some of the Member states universities, luckily for me, Instituto Superior Técnico (IST) is one of them. For me, physics was always a hobby, pursuing an engineering course not very coupled with

- Ivo Lopes, nr. 73888,
E-mail: ivo.l.pinto@ist.utl.pt, Instituto Superior Técnico,
Universidade de Lisboa.

Manuscript received June 6, 2015.

(1.0) Excellent	LEARNINGS					DOCUMENT							
(0.8) Very Good	Context × 2	Skills × 1	Reflect × 4	Summ × .5	Concl × .5	SCORE	Struct × .25	Ortog × .25	Exec × 4	Form × .25	Titles × .5	File × .5	SCORE
(0.6) Good	0.8	0.8	1.0	0.8	1.0		0.6	0.8	1.0	1.0	0.8	0.8	
(0.4) Fair													
(0.2) Weak													

physics, I couldn't let this opportunity escape. I consider knowledge to be from extreme importance specially knowledge about "everything", I say everything because physics is in the root of everything. As Ernest Rutherford, an English physician said "All Science is either physics or stamp collecting" [1].

My journey to CERN Spring Campus taught me a lot, there weren't many physics lectures unfortunately but the ones that existed were very informative. I've learned particle physics, standard model was explained to its fullest, as well as the difficulties they face at CERN to capture micro events at Large Hadron Collider (LHC) which consist of the largest and most powerful particle accelerator ever made, 27km ring of superconducting magnets with some impact chambers used for a different number of experiences, where was discovered the Higgs Boson but currently under maintenance. CMS Chamber can be seen in the figure 1.

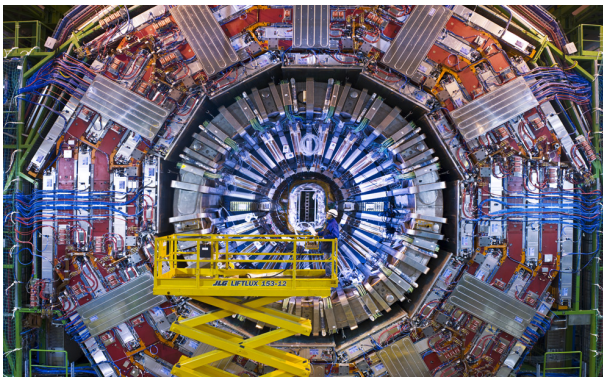


Figure 1. CMS Chamber of LHC.

There was only one physician Christos Lazaridis, incredible person works on level one triggers for the LHC. By the end of the event I would not consider my self a physician of course but certainly I'm more sophisticated.

3 SOFTWARE ENGINEERING

Software engineering is the study and an application of engineering to the design, development, and maintenance of software. Or so they say. For me Software engineering is developing software systems of quality and satisfy the requirements of the customer. At first I didn't even realize how important Software Engineering is to CERN. I joined the event aiming for

physics content and i was astonished when i read the program and 90% was Software Engineering content.

At the first breakfast break was when I had this conversation with a CERN data engineer, and he explained how important to CERN is computing and all that comes with it. Physics of course is what CERN is known for but in order to make possible happen all that "magic" there is a lot behind the scenes, and that is majorly provided by computing systems.

During my stay, I learned from web application security, agile development, groovy, Spring framework and many other topics however what I definitely learned the most was about "The art of mocking". An amazing technique used to simulate environments difficult to replicate specially useful to test not so common scenarios nonetheless important. This becomes from extreme importance specially when dealing with billion dollar equipment and no room for error, because that is what CERN deals everyday. This mocking consist putting it in short terms testing systems instead of as a whole, testing them by units. This allow them to find problems quicker, solve them independently of the rest of the components as well as run tests quickly.

I think my stay there was incredibly beneficial from a career viewpoint, much more than I was expecting. It was lectured many subjects that I already knew from my course however with real life applications which normally lacks in the universities courses, and its extremely beneficial to know more than just theory, know the application of the theory.

4 PERSONAL ENRICHMENT

This activity was not only about learning technical concepts. It had also focus on developing social skills. These are not as easy for people like us, Engineers, but luckily we have Portfolio.

At first, I thought scientific gatherings were all about sharing knowledge and technical expertise. They are, what i didn't know was all the social side of it. That's right, there is a social side to the scientific community. As strange as it may sound to some, physicians, engineers,

mathematicians or any others are humans as well and that makes them a social being. For those who share a profession or just a passion on these topics they may know the struggle of finding someone to talk to, however, in a event like CERN Spring Campus we were all pretty much alike.

Stories were shared, jokes told and most important friendships made. The event continued even after the lectures as we ventured ourselves into a few drinks and talks after-hours. These were the best times, I consider them to be maybe even more important than the lectures themselves. These are the times where our character is developed not on a technical level of course but on a human level.

There were also lectures on social skills, for example how to "behave" in a job interview or how to be professional in job seeking which proved valuable to one's development as a professional.

I am not a very social person myself, so maybe that is why I valued these meetings more over the lectures on social skills, but I believe these few days developed some of my social skills and myself as a whole.

5 CONCLUSION

After four consecutive days frequenting the event, I believe it was completely worth it and I surpassed my own expectations for this event. During my stay I not only learned from different areas of interest with professionals that without this invitation I would not have access but I also had an unique opportunity to meet wonderful new people and make friends. Opportunities like these don't come around easily and I am very glad I took it, I am now looking forward to next event taking place next year.

"Knowledge is Power", is what I started with and after this report I hope you as well believe and are willing to go in the search for knowledge.

ACKNOWLEDGMENTS

The author would like to offer thank CERN for their unique initiative, IST and professor Rui Santos Cruz for this opportunity that I would have not been aware about if it wasn't for them, every other person responsible for the realization of the Spring Campus and lastly professor Arlindo Oliveira for the work he has done to achieve the collaboration protocol between CERN and IST.

REFERENCES

- [1] C. Schiller, *Motion Mountain The adventure of Physics*. Christoph Schiller, 2007.

Bio ??