

SCIENCE CAN BRING PEOPLE TOGETHER

An Interview with Fabiola Gianotti, Director-General, CERN

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Dr. Fabiola Gianotti is an Italian particle physicist, Director-General of the European Organization for Nuclear Research (CERN), the first woman to hold this position.

Her mandate began on 1 January 2016 and runs for a period of five years.



Ms. Gianotti, you have known CERN for the past 25 years, how would you compare the CERN of 20 years ago to CERN today?

For sure CERN changed a lot during this period. The spirit and mission of CERN are the same: our mission covers scientific research, technological development, education and training and peaceful collaboration of scientists from all over the world. These main pillars did not change. The difference since 20 – 25 years ago is that now we have the Large Hadron Collider (LHC), which is an outstanding collider, and one of the most challenging projects ever realised by humanity. That is something we did not have 25 years ago - we were working to prepare for it, and now we have it. At the LHC we have discovered the Higgs boson (7 years ago), which is a very special particle, and made a large number of measurements of the known particles and searches for new ones.

How do you see the future, where is CERN heading to?

The next step is to upgrade the Large Hadron Collider to run with more intense proton beams (the so-called High Luminosity phase). The community is also updating the European Strategy for Particle Physics, which will recommend the direction for the future, in particular the next collider project.

The world knows you very well from the moment when you were one of the people who announced the discovery of the Higgs boson. What is your prediction - would there be a new discovery soon of this magnitude?

It is very difficult to predict, because we are really exploring uncharted territory and this is the essence of research. The open questions in particle physics require the existence of new particles, maybe also new forces. We may discover them soon or not. It depends at what energy scale the new phenomena manifest themselves. We have collected only a small fraction of the total data that the LHC and the High Luminosity LHC will produce. But even if we do not discover anything new, the LHC has already brought us the Higgs boson, and also allowed us to make very precise measurements of the known particles and to exclude many scenarios of new physics. The impact the LHC has already had, and will have by the end of its projected lifetime, on particle physics is immense, even if no further discoveries are made. The LEP collider, the predecessor of the LHC accelerator, did not discover any new particle, and yet it had an enormous impact on our understanding of fundamental physics.

Bulgaria and its institutions are preparing to celebrate the 20th anniversary of Bulgaria becoming a member state of CERN and we hope that you will be able to attend some of those celebrations.

I will come to Bulgaria on 20 – 21 November and attend some of the events – yes, I will be there.

What is your evaluation of the participation of Bulgarian scientists, engineers and specialists to the work of the ‘big laboratory’ and their contributions to CERN?

I think it has been a very fruitful and very important participation that has benefitted both CERN and Bulgaria. Bulgarian scientists have been involved in several projects, in particular their participation in the CMS (Compact Muon Solenoid) experiment is very important, with major contributions to the Hadron Calorimeter, the Muon Spectrometer and the data analysis. Another important contribution is related to the Worldwide LHC computing grid (WLCG) – Bulgaria is very strong in the domain of computing and software.

I think that the involvement of Bulgaria in CERN’s activities has been very useful for promoting and boosting science and technology in Bulgaria. It also contributed to raising generations of young physicists and engineers.

The education programs at CERN – what is the reason for attributing such an importance to them, especially taking into account the commitment of scientists to those programs?

Training of physicists, engineers and technicians, and education of the general public as well as high school students and high school teachers (we also have programs for Bulgarian teachers) are part of our mission. It is our duty to promote and train the new generation of scientists, but also, as a publicly funded research organisation, to reach out to society, to show to the public what we do and to try to attract more and more young people to STEM (Science, Technology, Engineering, Mathematics) studies. Society today is not really prepared for the challenges of tomorrow. We live in a world where technology is growing very fast and yet only 20% of the high-school students in Europe choose STEM education at the univer-

sity. CERN can contribute to raise vocations for STEM through our education and outreach programmes, such as the Teachers programme, school visits, etc. Bulgaria is one of the countries that profited in the best possible way from those programs. We are very happy that Bulgaria is such a strong partner in education.

We can say that CERN does not belong only to the physicists, and it is not only a work-site for the scientists. CERN is a model of living in a modern society. Do you agree with this?

Yes, absolutely, I strongly believe in this. We live in a fractured world where collaboration across borders is often questioned. Science is clearly one of those domains, which can bring people together, because science is universal and unifying. The passion for knowledge and for understanding more and more of how nature works is something that transcends the borders between countries, and cultural differences. This passion is intrinsic to the human being as a clever being. Therefore, science could be a unifying element in this fractured world; this is one more reason to promote science and CERN is a very good model for that. We attract 18 000 scientists from all over the world, more than 110 different nationalities. Bringing people together is part of our mission.

Days ago CERN had an ‘Open Days’ event and around 70 000 people to visit CERN. Taking into account this interest, do you think it would be possible to have more frequent ‘Open Days’ at CERN?

It is difficult to organize such an event on a more regular basis. The reason is that ‘Open days’ are synchronised with a shutdown period for the accelerators, which allows us to bring people to visit our underground facilities. The previous ‘Open Days’ event was in 2013, when we had the previous long shutdown period – “Long Shutdown 1”.

Today CERN has 23 member states, 5 associate member states and 2 associate member states in the pre-stage to membership. What is CERN’s policy for enlargement and which countries do you expect to join CERN during your mandate in the near future?

At the moment, there is one country that has applied for full membership, Estonia. The procedure has just started and it takes a little bit of time, because before becoming a member a country has to go through a minimum of 2 years of associate membership in the pre-stage to membership. We have two countries that have applied or are in the process of becoming associate members. Croatia should join soon - as all the formalities have been concluded. The other country is Brazil with which we are in discussions at the moment.

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