Fabiola Gianotti: Curriculum Vitae

Main professional steps

- 1989: PhD in experimental particle physics, University of Milano.
- 1990-1996: research physicist, University of Milano.
- 1996- : research physicist (permanent) in CERN's Physics Department.
- March 2009-February 2013: Head of the ATLAS Collaboration ("Spokesperson").
- 2016-2025: CERN Director-General.

Selected honours and awards

- Honorary Professor, University of Edinburgh.
- Corresponding or foreign associate member of the Italian Academy of Sciences (Lincei), the National Academy of Sciences of the United States, the French Academy of Sciences, the Royal Society London, the Royal Academy of Sciences and Arts of Barcelona, the Royal Irish Academy, the Russian Academy of Sciences, the Pontifical Academy of Sciences, the Swiss Academy of Sciences.
- Honorary doctoral degrees from: University of Uppsala (2012); Ecole Polytechnique Fédérale de Lausanne (2013); McGill University, Montreal (2014); University of Oslo (2014); University of Edinburgh (2015); University of Roma Tor Vergata (2017); University of Geneva (2018); University of Chicago (2018); University Federico II, Naples (2018); Université de Paris Sud, Orsay (2018); Université Savoie Mont Blanc, Annecy (2018); Weizmann Institute, Israel (2018); Imperial College, London (2019), Radboud University (the Netherlands, 2023) and Helsinki University (2024).
- "Cavaliere di Gran Croce dell'Ordine al Merito della Repubblica", awarded by the Italian President (2014).
- Special Breakthrough Prize in Fundamental Physics (shared, 2013); Enrico Fermi Prize of the Italian Physical Society (shared, 2013); Medal of Honour of the Niels Bohr Institute, Copenhagen (2013); Wilhelm Exner medal, Vienna (2017); Tate Medal of the American Institute of Physics for International Leadership (2019).

Summary of the research activity

I am a particle physicist working at high-energy accelerators. I have always been fascinated by the exploration of the energy frontier as one of the most powerful means to answer open questions in fundamental physics and the structure and evolution of the universe. In my scientific career, I made significant contributions to several experiments at CERN, including UA2 at the proton-antiproton collider (SpbarpS), ALEPH at the Large Electron-Positron collider (LEP) and ATLAS at the Large Hadron Collider (LHC). I worked on several aspects of these experiments, including detector R&D and construction, software development, and data analysis. I am (co-)author of more than 550 publications in peer-reviewed journals.

For my PhD thesis I worked on the search for new particles predicted by supersymmetric theories with the UA2 experiment, developing new detection techniques for these particles (some of which were subsequently used at the Tevatron collider in the United States) and establishing the most stringent limits at the time on the masses of certain supersymmetric particles (squarks and gluinos).
I continued my work on Supersymmetry in the ALEPH experiment at LEP, where I focused on the search for neutralinos (which are among the best candidates for dark matter particles).
I was involved in ATLAS since the beginning of the project, in the early '90s, and played an important role in all phases of the experiment, from detector R&D, design and construction to the preparation for data taking and data analysis, coordination of the physics activities and head of the experiment ("Spokesperson").
A major focus of my activities since the early '90s was the development of the instruments, software tools and best analysis strategies to be able to observe the Higgs boson at the LHC. In the early '90s, as part of a small team of people (initially less than ten), I worked on the development and tests of a novel-geometry ("accordion") liquid-argon electromagnetic calorimeter suitable for operation in the harsh LHC environment, i.e., providing a fast response, radiation resistance, and excellent energy resolution and particle identification capabilities. This pioneering work demonstrated that, in contrast to the past experience and prevailing opinion, a liquid-argon calorimeter can be fast enough (response time faster than 50 ns) to be used at the LHC. This major result led to the selection of the liquid-argon technology with "accordion" geometry for the ATLAS electromagnetic calorimeter, which was a crucial instrument for the observation of the Higgs boson in 2012. After two intense years of R&D work and prototype construction, I became responsible for the calorimeter design and co-coordinated the team of physicists and engineers in charge of optimising the layout (choice of the liquid, lateral and longitudinal segmentation, length of the upstream solenoid magnet coil, etc.). A Higgs boson with a mass of 130 GeV decaying into a pair of photons or into four electrons was one of the benchmark physics channels used for that work. In 1999, in virtue of my strong involvement on many aspects of LHC physics (searches for the Higgs boson and for physics beyond the Standard Model, measurement of the W boson mass, etc.), I was appointed ATLAS Physics Coordinator.
From March 2009 to February 2013, I held the elected position of ATLAS Spokesperson, being responsible for all scientific, technical, organisational, and resource aspects of the experiment. My work consisted of defining the overall scientific strategy and priorities of the experiment, ensuring the quality of the physics results, and addressing in a timely way a large number of scientific, technical, financial, administrative and human issues. Those four years as ATLAS Spokesperson were memorable for me: they coincided with the start of operation of the LHC after more than 20 years of construction and preparation work, the commissioning of the new and extremely complex ATLAS detector with collision data, the observation of already know particles (W and Z bosons, top quark, etc.) and their measurements in a new energy regime and the discovery of the Higgs boson, which was announced by ATLAS and CMS on 4 July 2012. The months leading to the discovery were extremely demanding and intense, but also very exciting and rewarding. I closely followed the analysis work, the necessary scrutiny of many details, and the huge number of tests and cross-checks that were performed and was on the frontline for the important decisions that ATLAS had to take in that extraordinary period. It was a challenge to keep the focus and lucidity of the Collaboration at such an emotional time.

In November 2014, I was appointed CERN Director-General, with term of office starting on 1 January 2016. In November 2019 I was appointed for a second term of office starting on 1 January 2021. This is the first time in the history of CERN that a Director-General is re-appointed for a full second term. As Director-General, I have the responsibility of defining and implementing the scientific and other objectives of the Organization, in accordance with the strategy set by the CERN Council. My work

covers the supervision of the current scientific programme and all the activities needed for the operation of a complex Laboratory; the preparation for CERN's scientific future; the optimum use of CERN's financial and human resources; personnel matters; and the relations with the Member States and other countries, with the European Commission, and with other international research institutions and organisations. I also represent the Organization before governments.
CERN's main accomplishments since 1 January 2016 include: the successful completion of the LHC second period of data-taking (Run 2) and part of the third period (Run 3), with the performance of the accelerator complex, experiments and computing exceeding expectation, and of the second long-shutdown, with major successful upgrades of the accelerators and the experiments; great progress on the LHC luminosity upgrade (HL-LHC) project, in particular with the completion of major underground civil engineering work and the development of new-technology superconducting magnets; the establishment of a "Physics Beyond Colliders" Study group to explore physics opportunities offered by CERN's accelerator complex that are complementary to the LHC; CERN's input to and participation in the 2020 update of the European Strategy for Particle Physics; the implementation of the 2020 European Strategy update; great progress on the feasibility study for a Future Circular Collider at CERN; the completion of the process for Brazil, Croatia, India, Latvia, Lithuania, Slovenia and Ukraine to become Associate Member States of CERN and Serbia and Estonia to become Member States; major efforts on environmental protection and sustainability, in particular with the establishment of a CERN Environmental Protection Steering board, the release of three public CERN Environment Reports, and the implementation of several measures to minimise CERN's impact on the environment and save or re-use energy; and the construction of a new facility for education and outreach targeting the general public (the Science Gateway), for which funds totaling 100 MCHF have been secured from external donations. In just one year operation the Science Gateway hosted some 400,000 visitors.

Selected national and international committees

- Elementary Particle Physics 2024: Progress and Promise, USA National Academy of Sciences (2022-)
- Selection committee for the President of CNRS, France (2021)
- Selection committee for the new President of the European Research Council (2018-2019)
- Science and Technology Advisory Group to the Managing Director (Christine Lagarde) of the International Monetary Fund (2018-2020)
- Board of Trustees of the World Economic Forum (2018-)
- Selection panel for the Presidents of the major Italian research institutes, Ministry for Education and Research, Italy (2012-2018)
- Selection committee for the President of CNRS, France (2017)
- Visiting committee for the scientific evaluation of CNRS, France (2016)
- Scientific Advisory Board of the U.N. Secretary-General, Mr Ban Ki-moon (2014-2016)
- Scientific Advisory Committee, Nikhef, the Netherlands (2014-2015)
- Senior Staff Advisory Committee, CERN (2014-2015)
- Scientific Council, DESY, Germany (2012-2015)
- Particle Physics Project Prioritization Panel, DOE and NSF, USA (2013-2014)

- Review panel of Japan's participation in the LHC upgrades, KEK, Japan (2013)
- Evaluation panel of physics research activities during 2007-2010 (ANVUR), Italy (2011-2013)
- Advisory panel to the Minister for Education and Research, Italy (2010-2013)
- Particle Physics Project Prioritization Panel, DOE and NSF, USA (2007-2010)
- Physics Advisory Committee, Fermi National Accelerator Laboratory, USA (2004-2009)
- CERN representative, Council of the European Physical Society (2004-2007)
- Evaluation panel of research projects, National Programme for Particle Physics, Spain (2006)

Other activities

- Talks and colloquia: more than 80 invited plenary presentations at international conferences; numerous colloquia and "distinguished lectures" at universities worldwide.
- Teaching and supervision: supervised the work of ~20 students and postdocs; lectured at physics schools worldwide (e.g. CERN-JINR European school of High-Energy Physics, Institute for Advanced Studies of Hebrew University of Jerusalem, NATO School in Virgin Islands).
- Referee work: reviewed ~50 articles for international journals; referee for numerous funding proposals for university grants.
- Outreach and communication: public lectures, numerous interviews with press and media, articles in scientific and other magazines (e.g. "The usefulness of useless knowledge", The Economist, 15 January 2019). Included among the "Top 100 most inspirational women" by The Guardian newspaper (UK, 2011), ranked "5th Personality of the Year 2012" by Time magazine (USA, 2012), included among the "Top 100 most influential women" by Forbes (USA, 2013 and 2017) and the "Leading Global Thinkers of 2013" by Foreign Policy magazine (USA, 2013).

Five representative publications with major personal contributions (in chronological order)

[1] B. Aubert et al.
Performance of a liquid-argon electromagnetic calorimeter with an "accordion geometry"
Nucl. Instrum. Meth. A309 (1991) 438.

[2] ALEPH Collaboration
Search for Supersymmetric Particles in e^+e^- Collisions at $\sqrt{s}$ up to 202 GeV and Mass limit for the Lightest Neutralino
Phys. Lett. B499 (2001) 67.

[3] F. Gianotti, M. Mangano, T. Virdee et al.
Physics potential and experimental challenges of the LHC luminosity upgrade
Eur. Phys. J. C39 (2005) 293.

[4] ATLAS Collaboration (discovery article)
Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC
Phys. Lett. B716 (2012) 1.

[5] ATLAS Collaboration
Measurements of Higgs boson production and couplings in di-boson final states with the ATLAS detector at the LHC
Phys. Lett. B726 (2013) 88.

Selected invited articles (in chronological order)

[6] F. Gianotti, Searches for Supersymmetry at high-energy colliders: the past, the present and the future, New J. Phys. 4 (2002) 1.1-1.24.

[7] C. Fabjan and F. Gianotti, Calorimetry for particle physics, Rev. Mod. Phys. 75 (2003) 1243.

[8] F. Gianotti, Physics at the LHC, Physics Reports 403-404 (2004) 379.

[9] F. Gianotti, Physics during the first two years of the LHC, New J. Phys. 9 (2007) 332.

[10] F. Gianotti and G.F. Giudice, Particle physics: a roadmap for the future, Nature Physics, 16 (2020) 997-998.