Professor Nancy Marinelli

Personal data

Full Name :	Nancy Marinelli
Nationality:	Italian
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Employment history:

Research Professor at the University of Notre Dame, IN, U.S., 2020 - Present.
Research Associate Professor at the University of Notre Dame, IN, U.S., 2013 - Present.
Research Assistant Professor at the University of Notre Dame, IN, U.S., 2008 - 2013.
Senior Research Associate at the University of Notre Dame, IN, U.S., 2006 - 2008.
European Fellowship for Young Researchers (FP5 Research Training Network), 2003-2006
Research Associate at Imperial College London, UK, 1997 - 2002.

University Education:

July 1997: Defence of Ph.D. thesis with the members of the Italian National Committee: Prof. B. Borgia (University "La Sapienza", Rome), Prof. G.Bendiscioli (University of Pavia) and Prof. M. Savoia (University of Bologna).
Nov 1993–Feb 1997: Ph.D. Scholarship (Dottorato di Ricerca), at the University of Bari, Italy. Title of the thesis: *Semileptonic Branching Ratios and Forward–Backward Asymmetry of b quark with the ALEPH detector*. Supervisor Prof. F. Romano and the referees Dr. P. Colangelo (INFN of Bari) and Prof. A. Pullia (University of Milano).
July 1993: First degree in Physics at the University of Bari, Italy, with the highest mark (110/110). My thesis,*Measurement of D^* meson production in $Z^0 \to c\bar{c}$ events with the ALEPH detector* was supervised by Prof. F. Romano, University of Bari.

Leadership experience

- **2018-Present:** L3 Co-Coordinator of the group for DAQ,Trigger, clock and control in the Ecal Barrel Upgrade project for the HL-LHC future operation.
- **2013-2015:** L3 Coordinator in the CMS Physics Data and Simulation Validation group. In charge of coordinating validation activities of all CMS Detector Performance and Physics Object Groups.
- **2011-2012:** L3 Co-leader of the sub-group of the CMS Electron-Photon in charge of the reconstruction of photons and electrons.
- **2008-2010:** Leader of the sub-group of the CMS Electron-Photon in charge of the reconstruction and identification of photon conversions.
- **2011:** CMS Run Field Manager, with overall responsibility of efficient and good quality data taking; co-leader, under the supervision of the Run Coordinator, of the whole crew (∼40 people) of shifters and experts necessary for taking care of the good running of the experiment. The role extends for three weeks per year.
- **2009-Present:** CMS shift leader for data taking operations, with responsibility over a team of five people to guarantee acquisition of high quality data with very high efficiency.

Good knowledge of online Data Acquisition procedures, as well as of Data Quality Monitoring and Trigger. A total of about a month per year is devoted to this activity with changing shift crews.

- **2007:** Coordinator of the HCAL monitoring at the beam test experiment H2, selector and leader of a team of seven people.

Supervising, mentoring and teaching experience

- **2018-Present** Supervisor of PhD Students at University of Notre Dame Mr. Prasanna Siddireddi, Mr. D. Lutton and Mrs L. Zygala, in activities of offline CMS Data Quality Monitoring and certification, development of High Level Synthesis algorythms for the Phase II upgrade of the CMS Ecal Barrel, development of Data Acquisition tools and tuning of Ecal energy clustering for LHC RunIII. Also supervisor of post-doc visiting at University of Notre Dame, Dr. S. Taroni, during work related with Ecal Barrel calibration and recovery of dead channels.

- **2014-2018:** Co-advisor with Prof. C. Jessop at the University of Notre Dame of PhD student Dr. M. Planer for his thesis "Measurement of the Higgs Boson cross-section and couplings in the two photon decay channel". Dr. Planer is now working in the private sector

- **2011-2013:** Co-advisor with Prof. C. Jessop at the University of Notre Dame of Dr. D. R. Berry for his thesis "Search for the Higgs boson in the two-photon channel". Dr. Berry is now Visiting Research Assistant Professor at University of Illinois.

- **2012:** Supervisor of PhD Student at University of Notre Dame Mr. N. Kellams, during his activity of offline CMS Data Quality Monitoring and certification, specifically photon data.

- **2010-2011:** Supervisor of PhD student Mr. Hongliang Liu (University College of Riverside, CA) as part of a collaboration with his advisor Prof. G. Hanson, during his presence at CERN in the first year of data taking, when he collaborated to the studies of the tracker material and later during the preparation of his PhD thesis, based on using conversions to identify off-pointing photons.

  2006-2011: Supervisor of PhD student at University of Notre Dame Mr. Ted Kolberg during all his presence at CERN and during the preparation of his PhD thesis on the "Measurement of the isolated photon cross section at 7TeV". Dr. Kolberg is now Assistant Professor at Florida State University.

- **2009-2010:** Supervisor of graduate students Mr. Jamie Antonelli (University of Notre Dame) in the development of software for offline CMS Data Quality Monitoring, specifically photon data. After a few years in academia, Dr. Antonelli is now working in the data science sector.

- **2000-2002:** Supervisor of PhD student Mr. Peter Walsham (Imperial College London) during his activity at CERN, mainly based on the tests and tracker data analysis of the very first LHC-like beam test. Dr. Walsham is now technical director and co-founder of Axomic Ltd.

- **1998-1999:**, Demonstrator in the Electronics Laboratory Sessions for 1st year students in Physics at Imperial College, London. Scripts with problems covering the basic subjects of Analog and Digital Electronics were prepared by the Head of Laboratory and I was in charge of assisting and periodically assessing the work of about eight students.

- **1996-1997:** Joint supervisor of Dr. Alessia Tricomi (now Researcher at the University of Catania) during her Ph.D. work which led to an improved measurement of the b quark forward–backward asymmetry with leptons with ALEPH data at LEP I.

- **1997:** Teaching Classical Mechanics to 1st year students in Engineering, on short fixed-term contract with the University and Politecnico of Bari as assistant to Prof. G. Maggi.

Professional Training

Apr 2013 *2013 Professional Leadership Development Workshop for Women Physicists* (8 h), Denver CO, Apr 12, 2013.
Jan 2007 *AXEL 2007 - Particle Accelerators* (30h), CERN, Geneva
July 2002: *C++ Programming Level2 - Traps and pitfalls* (32h), CERN, Geneva.
May 2002: *Hands-On Object-Oriented Design and Programming with C++* (24h), CERN, Geneva.
Oct 2001: *Course on Object Oriented Analysis and Design* (32h), CERN, Geneva.
Sept 1998: *Workshop on Teaching for Academic Staff*, Imperial College, London.
Sept 1996: *1996 European High–Energy School (CERN,JINR)* Carry le Rouet, France.
Sept 1994: *VII National Seminars on Nuclear and Subnuclear Physics*, Otranto, Italy.

Other knowledge and skills

- **Languages:** English (spoken: fluent; written: excellent), French (spoken: fluent; written: good), Italian (mother tongue).

- **Programming Languages:** Object Oriented C++, C, HTML, XML. Code versioning systems: SVN,GIT.

- **Operating Systems:** Linux, WindowsXP, Mac OS X.

- **Software Tools and Packages:** Latex, Microsoft Word, Powerpoint, Excel, Adobe Illustrator, Visual C++, ROOT.

Seminars and Presentations to Conferences

1. **2019**: *The CMS ECAL Upgrade for high precision timing and energy measurements at the HL-LHC"*, "LP2019: XXIX International symposyum on Lepton Photon interactions at High Energies", Toronto, Canada, 4-10 Aug 2019.

2. **2017**: *The CMS ECAL Upgrade for Precision Crystal Calorimetry at the HL–LHC* [58], "EPS-HEP 2017: European Physical Society conference on High Energy Physics", Venice, Italy, 5-12 July 2017.

3. **2014**: *CMS data preparation for Run II* [59], "ICHEP 2014: International Conference on High Energy Physics", Valencia, Spain, July 2-9, 2014.

4. **2013**: *Updated measurements of the Higgs-like boson at 125 GeV in the two photon channel*, High Energy Physics Seminar at the University of Notre Dame, IN, USA, Apr 18, 2013.

5. **2012:** *Search for the Higgs boson decaying in two photons at CMS* [60]. "HCP 2012: Hadron Collider Physics Symposium 2012", Kyoto University, Kyoto, Japan.

6. **2011:** *QCD Results at the LHC* [61]. Plenary talk given at "LC11 Workshop: Understanding QCD at Linear Colliders in searching for old and new physics", Trento, ECT*, 12-16 Sept 2011.

7. **2011:** *Physics with CMS: highlights from 2010* . Invited talk given at the "APS April Meeting 2011, 100 Years of Sub-Atomic Physics", Anheim, CA, Apr30-May3 2011.

8. **2009:** *Search for the SM Higgs Boson produced in Vector Boson Fusion and decaying into tau pair in CMS with 1fb^{-1}* [62]. Talk given at the "SUSY09- 17th International Conference on Supersymmetry and the Unification of Fundamental Interaction", Boston, Massachusetts 5-10 June 2009.

9. **2007:** *Track finding in gamma conversions in CMS* [63]. Talk given at the "ICATPP07 - 10th International Conference on Advanced Technology and Particle Physics", Villa Olmo, Como, Italy, 8-12 Oct 2007.

10. **2007:** *Higgs boson in non-minimal models* [64]. Talk given at the "SUSY07- 15th International Conference on Supersymmetry and the Unification of Fundamental Interaction", Karlsruhe, Germany, July 26 - Aug 1 2007.

11. **2006:** *New SUSY Results using Third Generation Tagging and Reconstruction at CMS.* Talk given at ""PASCOS06", Ohio State University, Columbus, US, 10-15Sep 2006.

12. **2006:** *Electron/photon reconstruction with CMS.* HEP Seminar at the University of Notre Dame, Indiana, US. January 31, 2006.

13. **2005:** *Searching for the Higgs boson. Where we stand. What we might get at the LHC.* HEP Seminar at the University of Glasgow, UK. September 30, 2005.

14. **2004:** *Neutral MSSM Higgs bosons from squark and gluino cascade decays with CMS* [65]. Talk given at "Physics at LHC 2004", Academy of Sciences, Vienna, Austria. July 13-17, 2004.

15. **2004:** *B Physics at CMS* [65]. HEP Seminar at CMA CERN Group - CERN. Feb 12, 2004.

16. **2003:** *B Physics at CMS* [66]. Talk given at the "9th International Conference on B-Physics at Hadron Machines",Pittsburgh,Pennsylvania, US. October 14–18, 2003.

17. **2002:** *Looking forward to Physics with CMS at the LHC.* HEP Seminar at Imperial College London, UK. November 19, 2002.

18. **2002:** *CMS Microstrip Silicon Tracker System Tests* [68]. Talk given at the "8th Workshop on Electronics for LHC experiments", Colmar, France. September 10, 2002.

19. **2002:** *Leptonic, semileptonic and hadronic decays of charmed mesons* [67]. Talk given at "Heavy Quark and Leptons", Vietri, Italy. May 2002.

20. **2001:** *Measurement of b branching fractions* [69]. Talk given at the "7th Topical Seminar on the Legacy of LEP and SLC",Siena, Italy. October 2001.

21. **2000:** *The CMS Tracker front–end and control electronics in an LHC–like beam test* [71]. Talk given at the "6th Workshop on Electronics for LHC experiments", Cracow, Poland. September 2000.

22. **2000:** *Leptonic decays of the D_s meson at LEP* [70]. Talk given at the "XXXth International Conference on High Energy Physics", Osaka, Japan. July 2000.

23. **1997:** *Measurement of* $|V_{cb}|$ *at the Z energy* [72]. Talk given at the "XVI International Workshop on Weak Interactions and Neutrinos", Capri, Italy. June 1997.

24. **1996:** *Measurements of the b quark forward–backward asymmetry at LEP*. Talk given at the "VIII Italian Meeting on LEP Physics", Padova, Italy. April 1996.

25. **1995:** *LEP results on the Semileptonic Branching Ratios of the b quark*. Talk given at the "VII Italian Meeting on LEP Physics", Genova, Italy. April 1995.

26. **1994:** *The b quark forward–backward asymmetry measurements in ALEPH*. Talk given at the "80th Italian Physics Society Congress (SIF)", Lecce (Italy). September 1994.

Activity 2018-present: CMS experiment at LHC, CERN, Geneva
Research Associate Professor at the University of Notre Dame:

- L3 Co-Coordinator of the group for DAQ,Trigger, clock and control in the Ecal Barrel Upgrade project for the HL-LHC future operation, in charge of coordinating the group of people who are designing and prototyping the different sections of the system which will allow the ECAL barrel to be performant during the HL-LHC.

- One of the recent activities as L3 Co-Coordinator of the group for DAQ,Trigger, clock and control in the Ecal Barrel Upgrade projec I co-lead the group set up to study/demonstrate the robustness of a lossless data compression scheme foreseen for the Phase II (HL-LHC) upgrade of the Electromagnetic Barrel calorimeter [36]. My major contribute was to design some of the tests necessary to achieve the goal.

- Responsible for studying and delivering ways of recovering Ecal Barrel dead channels, by inferring the energy from the neighbours channels. When a dead channels falls in the core of a shower, the measurement of it's shape is distorted. It is important to attribute an energy to the lost channel so to be able to recontruct the shower shape entirely. To this scope I designed an energy regression, based on a Boosted Decision Tree, which is able to infer the energy of a dead channel sitting in a 3×3 matrix of crystals. I supervised our postdoc and student for the validation of the method on Zee and Zmumu events. The software has been deployed in the CMS reconstruction software.

- Responsible for Offline Data Quality Monitoring of Photon physics objects. I developed in the beginning of CMS the necessary DQM software, I maintained it over the years and I use it for the actual validation of CMS recontruction software frequent releases on Monte Carlo samples.

- Member of the CMS B-physics sub-group which has developed a special trigger to write on tape about 10 billion B hadrons. Contributing specifically to extend the electron reconstruction to lower (than existing) transverse momenta for gaining efficiency on the reconstruction of B hadron decays with electrons in the final state. My major contribution, based on past expertise, is to use electrons from photon conversions as a control samples to validate the electron candidates.

- Editor in charge of the chapter related to the Ecal Barrel upgrade trigger primitive which will go in the to-be Level 1 trigger Technical Design Report. This is the continuation of the activity started in the previous two years.

Activity 2016-2017: CMS experiment at LHC, CERN, Geneva
Research Associate Professor at the University of Notre Dame:

- Contributor to the ECAL crystal intercalibration within the Ecal Detector Performance Group. One of the ingredient necessary to perform the intercalibration is a sample of Z

bosons decaying to electron pairs. Prior to the final selection of such events, is necessary to identify a data sub-sample, normally called skim, where loose Z boson identification criteria are applied to preserve the maximum efficiency. Then stricter requirements can be applied to this sub-sample tailored on the different applications. I supervised our student in tuning the selection requirement for the definition of the skimmed data sample.

- Responsible for the initial design and simulation studies of the ECAL (barrel) Level 1 trigger primitives in view of the upgrade foreseen for the HL–LHC phase. I developed the necessary simulation software which was used for the preliminary studies collected in the Ecal Barrel upgrade TDR [3] and the Level 1 trigger Interim Document [2]. I was also liason between the ECAL upgrade group and the Level 1 trigger upgrade group and Co-editor of both documents referenced above.

- Co-responsible, as member of a team, of the good operation and performance of the ECAL Level 1 trigger.

- Data analyis of Run II data at 13 TeV: measurement of the Higgs boson cross-section in the two-photon decay channel.

- Responsible for Offline Data Quality Monitoring of Photon physics objects. I developed in the beginning of CMS the necessary DQM software, I maintained it over the years and I use it for the actual validation of CMS recontruction software frequent releases on Monte Carlo samples.

- Member of the Publication Committee for Standard Model Physics.

Activity 2012 to 2015: CMS experiment at LHC, CERN, Geneva
Research Associate Professor at the University of Notre Dame:

- Data analysis of Run II data at 13 TeV: preparation for accurate measurements of the Higgs boson properties in the two-photon decay channel.

- Co-editor as well as main author of the final performance paper about photon recontruction in CMS from Run I [4].

- L3 Coordinator of Detector Performance and Physics Object Groups for the validation of reconstruction software. The charge includes coordinating the validation of the software upgrade required for the data-taking in 2015 after the Long Shutdown I as well as for the longer term upgrades foreseen to cope with the upgraded CMS in view of the SuperLHC phases 1 and 2.

- Data analysis of 2012 CMS data at 8 TeV:

    1. Search for the Standard Model Higgs boson in the di-photon decay channel with the 2012 data [6,17,16,38,37,5].My main contribution was in the di-photon vertex determination with converted photons and validation of photon identification criteria in Z$\rightarrow \mu\mu\gamma$ events.

- Co-sub-convener of the reconstruction group within the general CMS EGamma Physics Object Group.

- Responsible for Offline Data Quality Monitoring of Photon physics objects.

- Members of several Analysis Review Commitees, revewing the analyses [73,74,75].

Activity 2010-2011: CMS experiment at LHC, CERN, Geneva
Research Assistant Professor at the University of Notre Dame:

- Data analysis of 2011 CMS data at 7 TeV:

  1. Search for the Standard Model Higgs boson in the di-photon decay channel in the 2011 data [22,21,20,19,40, 39,8]. My main contribution was in the di-photon vertex determination with converted photons.
  2. Search for new physics with long-lived particles decaying to photons and missing energy in 2011 data [7,18,41]. The analysis was based on the reconstruction of off-pointing, displaced photons using conversions.

- Data analysis of 2010 CMS data at 7 TeV:

  1. Determination of the differential cross section of isolated photon production with 35/pb of CMS data [42,9].
  2. Preliminary measurement of inclusive photon spectrum with 3/pb of CMS data [24].
  3. Commissioning of electromagnetic objects, specifically isolated photons and converted photons [26,25].
  4. Performance of conversion reconstruction in $\sim$ 1/nb of Minimum Bias events and preliminary measurement of CMS Tracker material [28].

- Data analysis of first CMS data at 900 GeV: performance of conversion reconstruction in Minimum Bias events [27, 10].

- Express data analysis and data quality monitoring of photons for first CMS data during run at 900 GeV.

Activity 2008–2009: CMS experiment at LHC, CERN, Geneva
Research Assistant Professor at the University of Notre Dame:

- Responsible for development, maintenance, validation of CMS Photon reconstruction software.

- Responsible for Offline Data Quality Monitoring of Photon physics objects.

- Responsible for contacts between the CMS Electron-Photon Physics Object Group (POG) and the CMS Central Reconstruction group.

- Responsible for contacts between the CMS Electron-Photon Physics Object Group and the Particle Flow Physics Object Group.

- Member of the CMS Physics Validation group, representative of the Electron-Photon group and responsible for physics validation of photons.

- Main contributor to converted photon reconstruction within the new CMS Object Oriented software framework (CMSSW); completed in view of starting the data taking, natural extension of my past work. Main interest for such reconstruction is the energy flow and tau reconstruction [29] especially at low energies, fundamental for the MSSM Higgs boson search at CMS. Also very important in the field of QCD jet background rejection in important analysis such the search of the Higgs boson in the two-photons decay.

Activity 2006–2007: CMS experiment at LHC, CERN, Geneva
Senior Research Associate at the University of Notre Dame:

- Member of the central CMS Publication Committee (Editorial Board) A list of papers I reviewed is given later in the section devoted to publications.

- Responsible for in-situ data quality monitoring during the important first beam-tests involving the combined CMS hadronic and electromagnetic calorimeters (HCAL, ECAL). Final modules from ECAL and HCAL barrels (2006) and endcap (2007) were exposed to beams of pions and electrons of energies ranging from 2 GeV up to 300 GeV (H2 area at CERN Prevessin) in order to study the overall behaviour of the calorimeter. The automatic monitoring tool I developed served for prompt data quality check of the combined HCAL/ECAL data as well as of the wire chambers, muon detectors and Cherenkov detectors which were located along the beam line to achieve particle identification.

- Coordinator the 2006 data taking during the beam time devoted to study the different possible schemes of longitudinal segmentation for the HCAL endcap.

- Coordinator of the HCAL monitoring at H2 in 2007, selector and leader of a team of seven people.

Activity 2003–2005: CMS experiment at LHC, CERN, Geneva
EU Fellow Research Scientist at the IASA (Athens) and CERN. My activities are summarized here:

- Member of the Physics Reconstruction and Selection (PRS) Project in the CMS experiment for the future Large Hadron Collider (LHC) at CERN (Geneva). In particular I was responsible for the reconstruction of converted photons, a subject crucial for the search of the Higgs boson in the H$\rightarrow \gamma\gamma$ channel. The results of my work [30] became a contribution to the CMS Physics Technical Design Report (Vol 1, Ch.10, Sec. 3.3) [99].

- Member of the central Sub Editorial Board which was created in Jan 2003 to revise/approve all PRS related documents. A list of papers I reviewed is given later in the section devoted to publications.

- Member of the CMS Event Filter group (a sub-group of the CMS Data Acquisition Group) whose function is the development of the software necessary to perform the on-line High Level Trigger selection [102]. My responsibility was the provision and maintenance of code for data access and formatting of the Calorimetry section of the detector, primarily for the Electromagnetic Calorimeter (ECAL) [31]. To this end, I developed and maintained a number of related software sub-packages in the Object-oriented Reconstruction for Cms Analysis (ORCA) framework.

- Contact person between the CMS Event Filter group and the ECAL Data Acquisition team during the test-beam of October 2004, where the first complete ECAL supermodule equipped with the final front-end and DAQ electronics (and hence the final raw data format) was exposed to beam. I coordinated the first and successful test of the on-line Event Filter software.

- Responsible for the Release Management of the Consistent On-line Software INtegration Environment (COSINE) which allowed easy integration of purely reconstruction (ORCA) and on-line software for Event Filter on-line applications.

Activity 2000-2002: CMS experiment at LHC, CERN, Geneva
Research Associate at Imperial College London, and member of the local High Energy Physics group involved in the design and construction of the front-end readout electronics (and of the Data Acquisition interface card) of the Silicon Tracker for the CMS experiment. I was based at CERN on Long Term Attachment starting Nov 1999 in order to participate fully in the overall electronic system integration and beam test activities. My major contributions are summarized here.

- Member of the CMS Calibration Working Group from 2000 to 2002. I was one of the leading influences in the definition of calibration and synchronization procedures for the Microstrip Silicon Tracker [34] and My preliminary studies on simulated data samples for the definition of the final calibration algorithms are described in [33]. The work involved software development in the CMS general software framework (ORCA).

- I worked on the initial architectural design (2000) as well as on the implementation of some of the most critical components of the software system necessary to control the CMS Tracker. A preliminary description of the planned software architecture appeared in [13].

- During the early stages of the Tracker System Test (2002) [68], I was mainly involved in the development of the on-line software necessary to perform time synchronization of the system.

- In 2001, when the first final hybrids and silicon Tracker modules were delivered and required initial qualification, I contributed substantially to the development of the software tools needed for the test stations, concentrating on achieving synchronization of the prototype DAQ interface card for correct digitization of the acquired data.

- In May 2000 an LHC-like beam, with buckets separated by 25 ns, was delivered for the first time at CERN and was used to test the Tracker front-end electronics in a realistic environment. I had a leading role in setting up a DAQ "spy-channel" acquiring digitized data through a data-stream parallel to that of the official data acquisition. The parallel DAQ was conceived to monitor the system for synchronization losses, unwanted correlations between triggers as well as for on-line monitoring of pedestals, noise, common mode fluctuations and strip and cluster charge collection [71]. The spy channel was instrumental in the success of the test and was used for all the beam tests during 2000.

Activity 1997-1999: CMS experiment at LHC and ALEPH experiment at LEP, CERN, Geneva
Research Associate at Imperial College London, based in London sharing my research activity between CMS (80%) and the ALEPH experiment at LEP (CERN) (20%).

- For CMS I mainly worked on a software behavioural simulation of part of the logic embedded in the Silicon Tracker front-end read-out APV chip [35,11].

- For ALEPH I was refining the analysis which I had preformed for my Ph.D thesis (more details in the next section) on LEP I data aiming for a publication containing the conclusive ALEPH result [52,51,14].

Activity 1993-1997: Undergraduate and PhD student at the University of Bari, Italy
Member of the ALEPH Collaboration at CERN. My activities are summarized below.

- My major involvement was the analysis of ALEPH data, with particular interest in the physics of Heavy Flavour quarks. For my first degree thesis I studied the D^* production rate in Z decays, in the channel $D^* \to D^0\pi$, later extending the work by measuring the branching ratio $D^0 \to K^-\pi^+$ [56], the precision on this quantity being an important limiting factor in several measurements concerning B meson decays.

- During my Ph.D. I analyzed the properties of b quark production and decay at the Z energy becoming expert in different b tagging techniques, exploiting both the long lifetime

of hadrons containing a b quark, and the presence of a lepton with high transverse momentum among their decay products. My work lead to a new measurement of the inclusive semileptonic branching ratios of b hadrons, BR($b \to \ell$) and BR($b \to c \to \ell$), as described in [55], [54] and to updated measurements, using the full LEP I statistics, of the $B - \overline{B^0}$ average mixing and b forward–backward asymmetry [53], [15].

- Development and maintenance of software for control and monitoring of low and high voltages, as well as temperatures, of the ALEPH Hadron Calorimeter, were my contributions to the hardware of the ALEPH detector. Furthermore, in 1995, when the ALEPH Silicon Vertex Detector was upgraded for LEP phase II, I was a member of the local team in charge of testing and qualification of the raw silicon detectors.

- ALEPH HCAL coordinator, involving overall responsibility for the efficient running of the sub-detector through data quality monitoring, maintenance and upgrades of both hardware and software, and prompt intervention in case of malfunctioning. Coordination of a team of about ten people (physicists, engineers and technicians).

Full list of publications

Papers of which I was a main author published in international physics journals

CMS

1. "Measurement of Higgs boson properties in the diphoton decau channel in proton-proton collisions at $\sqrt{s}$= 13 TeV ", The CMS Collaboration, JHEP 11 (2018) 185.

2. "The Phase-2 Upgrade of the CMS Level-1 Trigger Interim Technical Design Report", CERN-LHCC-2017-013.

3. "The Phase-2 Upgrade of the CMS Barrel Calorimeters Technical design report", CERN-LHCC-2017-011.

4. "Performance of photon reconstruction and identification with the CMS detector in proton-proton collisions at $\sqrt{s} = 8$ TeV", The CMS Collaboration, J. Instrum. 10 (2015) P08010.

5. "Observation of the diphoton decay of the Higgs boson and measurement of its properties", The CMS Collaboration, Eur. Phys. J. C 74 (2014) 3076.

6. "Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC", The CMS Collaboration, Phys. Lett. B 716 (2012) 30-61.

7. "Search for new physics with long-lived particles decaying to photons and missing energy", The CMS Collaboration, J. High Energy Phys. 11 (2012) 172.

8. "Search for the standard model Higgs boson decaying into two photons in pp collisions at $\sqrt{s} = 7$ TeV", The CMS Collaboration,Phys. Lett. B 710 (2012) 403-425.

9. "Measurement of the Differential Isolated Prompt Photon Production Cross Section in pp Collisions at $\sqrt{s}$= 7 TeV", The CMS Collaboration, Phys. Rev. D 84, 052011 (2011).

10. "CMS Tracking performance results from early LHC running", The CMS Collaboration, CMS PAPER TRK-10-001, arXiv:1007.1988 ; CERN-PH-EP-2010-019, Eur. Phys. J. C 70 (2010) 1165.

11. "The APV emulator to prevent front-end buffer overflows within the CMS Silicon Strip Tracker", G. Iles, W. Cameron, C. Foudas, G. Hall, **N. Marinelli**. Contributed paper to the "8th Workshop on Electronics for LHC experiments", Colmar 2002, CERN/2002–003, CERN–LHCC/2002–34, LHCC-G-014.

12. "Study of radiation damage and substrate resistivity effects from beam test of silicon microstrip detectors using LHC readout electronics"
M. Angarano, W. Beaumont, M. Biasini, G.M. Bilei, M.T. Brunetti, B. Checcucci, C. Civinini, J. Coughlan, D. Creanza, M. De Palma, F. Drouhin, L. Fano, L. Fiore, M. French, A. Furtjes, A. Giassi, M. Giorgi, J. Gutleber, G. Hall, P. Lariccia, M. Loreti, G. Maggi, G. Mantovani, **N. Marinelli**, P. Mattig, G. Messina, S. My, A. Papi, V. Radicci, M. Raymond, R. Santinelli, G. Selvaggi, L. Servoli, L. Silvestris, P. Tempesta, A. Tsirou, P.G. Verdini, B. Wittmer. published in Nucl.Instrum.Meth. A488, pp. 85-93, (2002).

13. "The control system for the CMS Tracker front–end".
F. Drouhin, P. Figueiredo, P. Gras, C. Ljuslin, C. Maazouzi, A. Marchioro, **N. Marinelli**, C. Paillard, P. Placidi, P. Siegrist, A. Tsirou, P.G. Verdini, P. Walsham, A. Zghiche. published on IEEE Trans.Nucl.Sci., Vol. 49, No3, pp. 846-850 (2002).

ALEPH

14. "Inclusive semileptonic braching ratios of b hadrons produced in Z decays".
The ALEPH Collaboration, A.Heister et al., Eur. Phys. J. C 22 (2002) 4, 613 , CERN–PPE/2001–057

15. "Measurement of the b forward-backward asymmetry and mixing using high-$p_\perp$ leptons".
The ALEPH Collaboration, D. Buskulic et al., 29 May 1996, Phys. Lett. B384 (1996) 414, CERN–PPE/96–072

Refereed CMS public Notes of which I was a main author

16. "Evidence for a new state decaying into two photons in the search for the standard model Higgs boson in pp collisions",
The CMS Collaboration, CMS Physics Analysis Summary HIG-12-015, Contribution to July 4 2012 CERN Seminar and ICHEP2012.

17. "A search using multivariate techniques for a standard model Higgs boson decaying into two photons",
The CMS Collaboration, CMS Physics Analysis Summary HIG-12-001, Contribution to Moriond 2012.

18. "Search for new physics with long-lived particles decaying to photons and missing energy",
The CMS Collaboration, CMS Physics Analysis Summary EXO-11-067.

19. "Search for a Higgs boson decaying into two photons in the CMS detector",
The CMS Collaboration, CMS Physics Analysis Summary HIG-11-033 moved to Publication.

20. "Search for a Higgs boson decaying into two photons in the CMS detector",
The CMS Collaboration, CMS Physics Analysis Summary HIG-11-030.

21. "Search for a Higgs boson decaying into two photons in the CMS detector",
The CMS Collaboration, CMS Physics Analysis Summary HIG-11-021, Contribution to LP2011.

22. "Search for a Higgs boson decaying into two photons in the CMS detector",
The CMS Collaboration, CMS Physics Analysis Summary HIG-11-010, Contribution to EPS 2011.

23. "Measurement of the Differential Isolated Prompt Photon Production Cross Section in pp Collisions at $\sqrt{s}$= 7 TeV", The CMS Collaboration, CMS Physics Analysis Summary QCD-10-037 moved to Publication.

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I was also co–author with the CMS Collaboration of $>$ 900 more papers published on international physics journals such as PRD, PRL, JHEP, PLB, JINST, EPJ.

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I was also co–author with the ALEPH Collaboration of 172 more papers published on international physics journals.