CURRICULUM VITAE

Alberto Annovi

Curriculum degli studi

Marzo 2001: laurea con 110 e lode in fisica (vecchio ordinamento) presso l'Università di Pisa, tesi di laurea "Ricostruzione di traiettorie in tempo reale a LHC e gli eventi adronici Httbar", relatore Prof. Mauro Dell'Orso
Novembre 2001: diploma con 70/70 e lode in Fisica presso la Scuola Normale Superiore di Pisa
Gennaio 2005: titolo di dottore di ricerca in fisica presso l'Università degli Studi di Pisa, tesi di dottorato "Hadron collider physics with real time trajectory reconstruction", relatore Prof. Mauro Dell'Orso

Esperienze di lavoro

Ricercatore INFN a tempo indeterminato presso la sezione di Pisa, da ottobre 2014 e tutt'ora in servizio
CERN scientific associate, marzo 2017 – febbraio 2018
CERN associate, gennaio 2013 – dicembre 2014
Ricercatore INFN a tempo indeterminato presso i Laboratori Nazionali di Frascati, maggio 2009 – settembre 2014
Ricercatore INFN a tempo determinato ("tenure track") presso i Laboratori Nazionali di Frascati, selezione nazionale (art. 36) 1N/R3/SUB (2005), dicembre 2005 – aprile 2009
Fermilab visiting scientist, gennaio 2005 – marzo 2006
Assegno di ricerca presso l'Università di Pisa, gennaio 2005 – dicembre 2005
Borsa di dottorato in Fisica presso l'Università di Pisa, gennaio 2002 – dicembre 2004
Borsa INFN alla Sezione di Pisa, luglio 2001 – dicembre 2001
Contratto di collaborazione con l'Università di Pisa, aprile 2001 – giugno 2001
Summer Student a Fermilab, estate 1999

Organizzazione di conferenze, peer reviewer, relatore presso scuole avanzate, attività divulgative

Membro dei comitati organizzativi per le seguenti conferenze e workshop:
Higgs Pairs Workshop 2025 co-chair
8th INFIERI School 2025
Connecting the Dots 2020, 2022, 2023 comitato internazionale
Connecting the Dots, Workshop on Intelligent Trackers (WIT) 2017, 2019 comitato internazionale
Vertex 2016 comitato locale
MOCAST 2015, 2016, 2018 (program committee)
pp@LHC 2016 workshop italiano comitato locale
Workshop on Intelligent Trackers (WIT) 2012 e 2014 comitato internazionale
ATLAS Trigger Workshop 2019

Referee per le riviste:
Nuclear Instrumentation Methods A
Advances in High Energy Physics

Referee MIUR per progetti PRIN:

Referee per bandi RitaLeviMontalcini
2017: invitato come relatore su “Trigger and data acquisition” alla scuola HASCO 2017
2016: invitato come relatore su “Upgrade di ATLAS e CMS per HL-LHC” al XXVIII Seminario Nazionale di Fisica Nucleare e Subnucleare (Scuola di Otranto)
Guida per le visite delle scuole presso i Laboratori Nazionali di Frascati.

Responsabilità scientifiche

2023-: Co-coordinatore del workpackage 2 dello spoke2 del Centro Nazionale di Ricerca in HPC, Big Data and Quantum Computing
2023-: Referente per la sezione INFN di Pisa per la terza missione
2021-: Coordinatore italiano per il progetto TDAQ dell’esperimento ATLAS
2021-2022: Coordinatore italiano per il progetto EF Tracking dell’esperimento ATLAS
2019-2020: responsabile nazionale progetto INFN di trasferimento tecnologico PUMA
2017-2018: **responsabile nazionale** per il progetto Hardware Tracking for the Trigger (HTT)
2016-2019: co-responsabile ATLAS per il progetto di upgrade di fase-2 Hardware Tracking for the Trigger (HTT) a cui stanno partecipando più di venti istituti ATLAS
2017-2019: **responsabile nazionale** e locale per il progetto Fast Traker
2017-2019: responsabile per la scheda Associative Memory board del progetto Fast Tracker
2014-2017: **responsabile nazionale** per la sigla CSNI RDfase2 Track Trigger lato ATLAS
2014-2017: **project leader** dell’ATLAS Fast Tracker upgrade, una collaborazione di 16 istituti
2013: **scientist in charge** per il progetto Marie Curie ARTLHCFE
2012-2013: co-editor of the Fast Tracker TDR
2012: responsabile della "vertical slice del processore FastTrack" per ATLAS
2011-2012: responsabile AMchip04 (primo AM ASIC **a risoluzione variabile**) e inventore della memoria associativa a risoluzione variabile
2010-2011: **responsabile del progetto** "Accurate Real time Tracking at LHC". Progetto di grande rilevanza nel Programma Esecutivo di collaborazione scientifica e tecnologica bilaterale Italia – Giappone
2010-2014: rappresentate per Frascati presso il TriggerDAQ di ATLAS
2010-2012: responsabile del centro di calcolo grid per ATLAS: Tier2 di Frascati
2007-2013: responsabile locale progetto FastTrack
2005-2006: **project leader** dell’upgrade del Silicon Vertex Trigger per l'esperimento CDF II
2004: co-responsabile progetto AMchip03

Curriculum vitae et studiorum

Redatto ai sensi dell'art. 47 del D.P.R.445/2000 e successive modificazioni

Mariangela Bondí

Name: Mariangela Bondí
Nationality:
e-mail:

Studies

2015 PhD in Physics, University of Catania, "Heavy-ion double charge exchange reactions as tools for $0\nu\beta\beta$ decays (Tutors: Prof F. Cappuzzello) 40Ca(18O,18Ne)40Ar reaction at 270 MeV by using MAGNEX

2011 Master's degree in Physics, University of Catania, scores: 110/110 cum laude

Work experiences

September 2022 -Present Thecnologist at INFN - Sezione di Catania;

February 2022 - September 2022 RTD-A (Fixed-term researcher) at University of Roma Tor Vergata;

2020 -January 2022 Post-Doc at INFN - Sezione di Genova;

2015 - 2019 Post-Doc at INFN - Sezione di Catania;

International collaborations

2020 - now Member of CLAS Collaboration (JLab – US)

2020 - now Member of EIC (ePIC) Collaboration (BNL - US)

2015 - now Member of BDX Collaboration (JLab - US)

2015 - now Member of HPS Collaboration (JLab - US)

Scientific activity

2024 - now Co-spokesperson proposal at PAC53 "Electro- and photo-production of muon pairs with μCLAS12: Double Deeply Virtual Compton Scattering, Timelike Compton Scattering, and J/Ψ production"

2024 - now Responsible of MC simulation for MPDG EndCap trakcers of EPIC@EIC

2024 - now Responsible of MC simulation for MPDG EndCap trakcers of EPIC@EIC

2022 - now Co-spokesperson experiment E-12-16-001 'Dark matter search in a Beam-Dump eXperiment (BDX) at JLab

2021 - now Co-Responsible of MC simulation for CLAS12 upgrade

2020 -2022 Coordinator of SRO prototype readout system testing and data analysis

2019 -2021 Co-coordinator of BDX-MINI detector, data-taking and data analysis

2018 -2019 Coordinator of BDX-HODO detector, data-taking and data analysis

2015–2018 Co-coordinator of BDX-PROTO test campaign and external veto system

Published papers

May 2025 Total: 115, h-index: 24;

Workshop and Conference Organizing Committees

2025 OC Member, SRO-XIII - Catania, Italy

2025 LOC Member, LDMA'25 – Genova, Italy

2019 LOC Member, LDMA'19 – Venice, Italy

2017 LOC Member, LDMA'17 – Elba Island, Italy

Talks at conferences and workshops

2025 Talk: "Future physics opportunities with CLAS12 upgrades",The 61st International Winter Meeting on Nuclear Physics, Bormio, Italy;

2024 Invited Talk: "Experimental overview of Sub-GeV Physics in the Dark sector", Science at the Luminosity Frontier: Jefferson Lab at 22 GeV, Frascati, Italy;

2024 Invited Talk: "BSM physics at JLab: new opportunities with secondary beams and CEBAF positron upgrade", Hadron Physics 2030, Orsay, France;

2024 Invited Talk: "The CLAS12 luminosity upgrade and future physics opportunities", DIS2024, Grenoble, France;

2024 Invited Talk: "From the fruitful experiences with CLAS12 Forward Tagger towards the next generation calorimeters", APS April Meeting 2024;

2023 Invited Talk: "SRO test at JLAB", Streaming readout Workshop SRO-XI, Hawaii, USA;

2023 Invited Talk: "New opportunities at JLAB using secondary beams", Science at the Luminosity Frontier: Jefferson Lab at 22 GeV Workshop, Jefferson Lab;

2022 Invited Talk: "Light Dark Matter Factory @ JLAB", International Conference on Neutrino and Dark Matter (NuDM2022), Sharm el Sheik;

2021 Talk: "Recent experience with Streaming Readout for CLAS12-Forward Tagger", TIPP 2021, Vancouver, CA.

2021 Talk: "Streaming data acquisition system for CLAS12 Forward Tagger", CPAD Instrumentation Frontier Workshop 2021, Stony Brook, NY, USA

2019 Talk: "The BDX detector prototype for Dark Matter searches in a Beam Dump eXsperiment @ JLAB", 15th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD19), Siena, Italy;

2018 Talk: "The Beam Dump eXperiment", 13th Conference on the Intersections of Particle and Nuclear Physics - CIPANP Palm Springs, USA;

2017 Invited Talk: "Review on searches for light dark matter at fixed target electron accelerators", 13th Rencontres du Vietnam: Exploring the Dark Universe, Quy Nhon, Vietnam.

2016 Talk: "Study of the response of a CsI(Tl)-SiPM detector to low energy protons", 14th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD16), Siena, Italy;

2013 Talk: "Selectivity of the (^{18}O,^{16}O) two-neutron transfer reaction", 63th International Conference on Nuclear Physics - Nucleus 2013 Moscow, Russia.

2013 Talk: "(^{18}O,^{18}Ne) Double charge-exchange reaction with MAGNEX", 7th European summer school on experimental nuclear astrophysics, Santa Tecla, Italy.

Teaching and academic activity

2024 Master thesis supervisor, "Characterization of innovative glass scintillators for future calorimetry" I.Cali – University of Catania

2021 Master thesis supervisor, "Characterization of innovative glass scintillators for future calorimetry" M.Spreafico – University of Genova

2020 - 2021 Contract lecturer at the University of Genova (General Physics for Mechanical Engineering)

Outreach

2022 - now Outreach Coordinator of INFN - Sezione di Catania

Research activity

I carry out my research in experimental hadron physics and light dark matter search with high-intensity electron beams. I am a member of the international collaborations CLAS, EPIC, BDX, and HPS.

My main research interest focuses on probing light dark matter in fixed-target experiments. I am currently the co-spokesperson of the BDX experiment at Jefferson Lab, which aims to search for sub-GeV dark matter particles produced via the interaction of a high-intensity 11 GeV electron beam from CEBAF with the Hall A beam dump. The experiment is designed to detect potential dark matter signals through scattering in a downstream detector system. I am also a member of the Heavy Photon Search (HPS) collaboration, which searches for a new vector boson (dark photon, A') in a similar mass range.

Since 2020, my research has also expanded into the domain of hadronic structure and spectroscopy, through my involvement in the CLAS12 and EIC collaborations. Within CLAS12, I am contributing to

the Phase 1 luminosity upgrade (x2), particularly by developing Monte Carlo simulations for a new forward tracking system based on μRWELL detectors.

I am also part of the Phase 2 upgrade working group, which aims to enhance the luminosity by a factor of 100, making possible studies of previously unexplored processes, such as Double Deeply Virtual Compton Scattering (DDVCS) and Time-like Compton Scattering (TCS). This requires a modified CLAS12 detector, optimized for operation at enhanced luminosities, and I am involved in Monte Carlo simulations aimed at optimizing the new components of the detector. I am also the co-spokesperson of the experiment proposal "Electro- and photo-production of muon pairs with CLAS12: Double Deeply Virtual Compton Scattering, Timelike Compton Scattering, and J/ production."

My activities are sinergyc between CLAS12 and EIC. I am involved in the development of streaming data acquisition systems, which are relevant for both CLAS12 and BDX, and will be fundamental for future detectors like EPIC. In the context of EPIC, I am responsible for the simulation and integration of tracking disks based on μRWELL technology into the simulation framework. I also take part in beam tests and data analysis for μRWELL prototypes. I have developed the analysis software and coordinate the data analysis for the beam tests. In addition, I contribute to generic detector RD efforts at EIC, particularly to the development of a novel glass-based scintillating material (SciGlass) for use in homogeneous calorimeters. I have led the characterization campaigns of the first large-area samples and supervised student work on this topic.

Massimo Casarsa

January 27, 2026

Professional History

2023-present: Senior Researcher at the Italian Institute for Nuclear Physics (INFN).

2011-2022: Researcher at the Italian Institute for Nuclear Physics (INFN).

2006-2011: Guest Scientist at the Fermi National Accelerator Laboratory.

2002-2006: INFN Research Grant for the CDF experiment at the FNAL Tevatron.

Education

1999-2001: Ph.D. in Experimental High-Energy Physics at the University of Trieste, Italy.

1998: "Post Lauream" INFN fellowship for the KLOE experiment at the Frascati National Laboratory, Italy.

1991-1997: Master's Degree in Physics (*Laurea*) at the University of Trieste, Italy.

Research Activity

Main contributions to the Muon Collider studies (2018-present):

- Coordination of the working group on detector studies for colliders at center-of-mass energies of 3 and 10 TeV (2019-present).
- Development of the muon collider software (2018-present) [1, 2].
- Detector studies:
  - characterization of the beam-induced background at 125-GeV and 1.5-TeV colliders (2018-2019) [3];
  - first study of the tracking detector response in the presence of the beam-induced background (2018-2019) [4]; mitigation of the beam-induced background, optimization of the tracking detector and tracking performance studies (2019-present) [5, 6]; assessment of the performance of the muon collider detector in reconstructing photons and electrons (2021-2022) [6];

  - detector design for a muon collider of 10-TeV center-of-mass energy (2022-present) [7, 8].

- Physics studies with a detailed detector simulation:
  - first study of the $H \to b\bar{b}$ production cross section at a 1.5-TeV collider (2019-2020) [4];
  - study of the potential of a 3-TeV muon collider for the measurement of the $H \to \mu\mu$ decay channel (2021) [9];
  - search for a dark photon or an axion-like particle at a 3-TeV and 10-TeV muon collider (2021) [10];
  - physics potential of a 3-TeV muon collider in the Higgs sector (2021-2022) [11].

Main contributions to the CMS Experiment at CERN (2011-present):

- Production Manager position (2012-2014): coordination and management of the Monte Carlo samples production.
- Responsible for the MIP Timing Detector simulation and reconstruction software (2018-2020).
- Detector activity:
  - R&D for a level-1 track trigger for the CMS detector in the LHC high-luminosity phase (2013-2017) [12];
  - absolute calibration of the CMS luminosity measurement (2016): analysis of the van de Meer special scans [13];
  - R&D for a MIP Timing Detector for the CMS experiment (2017-present): simulation and reconstruction software [14].
- Data analysis:
  - measurements of jet multiplicity and differential production cross sections of Z+jets events in proton-proton collisions at $\sqrt{s} = 7$ TeV (2011-2012) [15].

Main contributions to the CDF Experiment at FNAL (2002-2012):

- Co-Head of the CDF Operations Group with the full responsibility of the CDF detector and data taking (2008-2011) [16].
- Operation Manager position (2007-2008): data-taking coordination, supervision of the daily operations on the detector and its infrastructure, organization and supervision of repairs and maintenance work on the detector.

- Member of the CDF Speaker Committee (2008-2011).
- Coordinator of the CDF Track-trigger Group (2007-2008).
- Software activity:
  - design and implementation of the monitoring software of the CDF analysis farm (2002-2003) [17];
  - implementation of a procedure and software tools to produce skimmed tertiary datasets of CDF data (2004-2005).
- Detector activity:
  - upgrade of the CDF calorimeter level-2 trigger: readout code of the new electronic boards (2006-2007) [18];
  - improvement and optimization of the trigger strategies for the Higgs boson discovery: design of a new fully calorimetric trigger for a Higgs boson produced in association with a W boson (2006-2007) [19].
- Data analysis:
  - charmless multibody decays of B mesons (2003-2004) [20];
  - mixing of B_s^0 mesons (2004-2005) [21, 22];
  - search for the Higgs boson in the $H \to WW$ channel with hadronically decaying taus in the final state (2008-2012) [23].

Main contributions to the KLOE Experiment at the Frascati National Laboratory (1998-2001):

- Detector activity:
  - energy calibration of the electromagnetic calorimeter of the KLOE detector (1999-2001) [24];
  - design and implementation of on-line software for monitoring and time calibrations of the electromagnetic calorimeter (1999-2000) [25].
- Data analysis:
  - study of the fully neutral decays of K_L^0 mesons and measurement of the ratio of the K_L^0 decay widths to the final states $\pi^0\pi^0\pi^0$ and $\pi^0\pi^0$ (2000-2001) [26].

References

[1] The Muon Collider Software, https://github.com/MuonColliderSoft.

[2] N. Bartosik *et al.*, *"Full Detector Simulation with Unprecedented Background Occupancy at a Muon Collider"*, Comput Softw Big Sci 5, 21 (2021).

[3] N. Bartosik *et al.*, *"Preliminary Report on the Study of Beam-Induced Background Effects at a Muon Collider"*, `arXiv:1905.03725 [hep-ex]` (2019).

[4] N. Bartosik *et al.*, *"Detector and Physics Performance at a Muon Collider"*, JINST 15 P05001 (2020).

[5] M. Casarsa *et al.*, *"Detector Performance Studies at a Muon Collider"*, PoS ICHEP2020 826 (2021).

[6] C. Accettura *et al.* (International Muon Collider Collaboration), *"Towards a muon collider"*, Eur. Phys. J. C 83, 864 (2023).

[7] M. Casarsa, D. Lucchesi, and L. Sestini, *"Experimentation at a muon collider"*, Annu. Rev. Nucl. Part. Sci. 74, 233 (2024).

[8] M. Casarsa, *"Detector performance for low- and high-momentum particles in $\sqrt{s} =$ 10 TeV muon collisions"*, PoS ICHEP2024 1108 (2025).

[9] V. Candelise, M. Casarsa, and A. Montella, *"Prospects for the measurement of $\sigma_H \times BR(H \to \mu\mu)$ at a 3-TeV muon collider"*, PoS EPS-HEP2021 579 (2022).

[10] M. Casarsa, M. Fabbrichesi, and E. Gabrielli, *"Monochromatic single photon events at the muon collider"*, Phys. Rev. D 105, 075008 (2022).

[11] P. Andreetto *et al.*, *"Aspects of Higgs Physics at a $\sqrt{s} = 3$ TeV Muon Collider with detailed detector simulation"*, Eur. Phys. J. C 85, 221 (2025).

[12] S. Ajuha *et al.*, *"Charged particle tracking in real-time using full-mesh data delivery architecture and associative memory techniques"*, JINST 17 P12002 (2022).

[13] V. Khachatryan *et al.* [CMS Collaboration], *"CMS Luminosity Calibration for the pp Reference Run at $\sqrt{s} = 5.02$ TeV"*, CMS-PAS-LUM-16-001 (2017).

[14] A.M. Sirunyan *et al.* [CMS Collaboration], *"A MIP Timing Detector for the CMS Phase-2 Upgrade – Technical Design Report"*, CERN-LHCC-2019-003 (2019).

[15] V. Khachatryan *et al.* [CMS Collaboration], *"Measurements of jet multiplicity and differential production cross sections of Z+jets events in proton-proton collisions at $\sqrt{s} = 7$ TeV"*, Phys. Rev. D **91**, 052008 (2015).

[16] M. Andrews *et al.*, *"Accelerator/Experiment Operations - FY 2009"*, FERMILAB-TM-2453-DI (2009); M. Adamson *et al.*, *"Accelerator/Experiment Operations - FY 2010"* FERMILAB-TM-2477-DI (2010); P. Adamson *et al.*, *"Accelerator/Experiment Operations - FY 2011"*, FERMILAB-TM-2527-DI (2011).

[17] M. Casarsa *et al.*, *"The CDF Analysis Farm"*, AIP Conf. Proc. **794**, 275 (2005).

[18] A.A. Bhatti *et al.*, *"Level-2 Calorimeter Trigger Upgrade at CDF"*, IEEE Trans. Nucl. Sci. **56**, 1685 (2009).

[19] M. Casarsa *et al.*, *"A High Quality Trigger Selection for the HW Discovery Channel at CDF"*, IEEE-NSS Conference Record Vol. 1, 834 (2007).

[20] D. Acosta *et al.* [CDF Collaboration], *"Evidence for $B_s^0 \to \phi\phi$ decay and measurements of branching ratio and A_{CP} for $B^+ \to \phi K^+$"*, Phys. Rev. Lett. **95**, 031801 (2005).

[21] M. Casarsa, P. Catastini, G. Punzi and L. Ristori, *"A statistical prescription to estimate properly normalized distributions of different particle species"*, Nucl. Instrum. Meth. A **640**, 219 (2011).

[22] A. Abulencia *et al.* [CDF Collaboration], *"Measurement of the B_s^0-$\bar{B}_s^0$ Oscillation Frequency"*, Phys. Rev. Lett. **97**, 062003 (2006).

[23] T. Aaltonen *et al.* [CDF Collaboration], *"Searches for the Higgs boson decaying to $W^+W^- \to \ell^+\nu\ell^-\bar{\nu}$ with the CDF II detector"*, Phys. Rev. D **88**, no. 5, 052012 (2013).

[24] M. Adinolfi *et al.* [KLOE Collaboration], *"The KLOE electromagnetic calorimeter"*, Nucl. Instrum. Meth. A **482**, 364 (2002).

[25] A. Aloisio *et al.* [KLOE Collaboration], *"Data acquisition and monitoring for the KLOE detector"*, Nucl. Instrum. Meth. A **516**, 288 (2004).

[26] M. Casarsa, *"Study of the Neutral Decays of the K_L for the CP Violation Measurement at KLOE"*, Ph.D. Thesis, University of Trieste, Trieste (2001).