

João Pedro Barreiro Guimarães da Costa

Curriculum Vitae

17 Oxford Street
Cambridge, MA 02138

☎ (617) 495-8536

☎ (630) 696-7286

☎ (+41) 76 487-2797

✉ guimaraes@physics.harvard.edu

📄 scholar.harvard.edu/joaoguimaraes



Education

- 2000 **Ph.D. in Physics**, *The University of Michigan*, Ann Arbor, "Search for a fourth generation quark more massive than the Z boson".
- 1996 **M.A. in Physics**, *The Johns Hopkins University*, Baltimore.
(transferred with advisor to the University of Michigan in 1998)
- 1996 **M.Sc. in Physics**, *Technical University of Lisbon*, Lisbon, "Measurement of the relative production of vector-mesons $\phi/(\rho + \omega)$ in sulphur - uranium collisions at beam momentum of 200 GeV per nucleon".
- 1993 **Licenciatura in Physics Engineering**, *New University of Lisbon*, Lisbon, "System for research on multilayer thin films. Study of abnormal glow discharges".

Professional Appointments

- 2011-present **Associate Professor**, *Harvard University*.
CDF and ATLAS experiments
- 2006-2011 **Assistant Professor**, *Harvard University*.
CDF and ATLAS experiments
- 2003-2006 **Research Associate**, *Harvard University*.
CDF experiment
- 2000-2002 **Postdoctoral Fellowship**, *Harvard University*.
ATLAS and CDF experiments
- 1998-2000 **Research Assistant**, *The University of Michigan*.
CDF experiment
- 1995-1998 **Research Assistant**, *The Johns Hopkins University*.
CDF experiment
- 1993-1994 **Masters Degree Fellow**, *Laboratory of Instrumentation and High Energy Physics*, Lisbon.
NA38/NA50 experiment at CERN
- 1990-1993 **Junior Research Assistant**, *New University of Lisbon and Instituut voor Atom-en Molecuulfysica*.
Solid state physics

Selected Professional Activities

- 2013-Present **New Small Wheel Trigger Processor Working Group Coordinator**.
Responsible for the design and integration of the Trigger Processor for the ATLAS Small Wheel upgrade.
- 2011-Present **ATLAS Representative to the LHC Electroweak Working Group**.
Contact for the coordination of QCD and electroweak physics result from the ATLAS, CMS and LHCb collaborations.

- 2011-2013 **Co-convenor of the ATLAS Standard Model Group.**
Responsible for a large range of ATLAS publications including QCD and electroweak physics.
- 2010-2011 **Convenor of the ATLAS Electroweak Group.**
Responsible for electroweak precision measurements and diboson cross section measurements.
- 2010 **Co-convenor of the ATLAS W/Z Muon Observation Group.**
Lead the first analyses of the observation and cross section measurements of the W and Z bosons in the muon channel. This effort established many of analysis techniques for the first high- p_T physics papers at LHC.
- 2007-2009 **Responsible for the Commissioning of the ATLAS Endcap MDT Detector.**
Led the commissioning of the Endcap Monitored Drift Tube Spectrometer at CERN, and its integration with the rest of the ATLAS detector.
- 2003-2004 **Co-convenor of the CDF High- p_T B-Tagging Group.**
Responsible for the development and characterization of the algorithms for identification of b -quark jets used in the high- p_T physics analysis: studies of top quark, searches for new physics and QCD analysis.
- 2002-2003 **Co-convenor of the Primary Vertex and Beamline Group.**
Responsible for the precise determination of the hard-interaction location in an event-by-event and run-by-run basis. Results used by virtually all CDF analysis.

Experimental technologies

- 2000-2013 **Muon drift chambers**, *Construction of the ATLAS Monitoring Drift Tube chambers*, Design and testing of the on-chamber readout electronics. Definition of the on-chamber interconnects and Faraday cage. Installation and commissioning in ATLAS cavern. Data acquisition and early operation.
- 1995-2005 **Tracking drift chambers**, *Construction of the CDF Center Outer Tracker*, Design of the on-chamber high-voltage electronics. Operation monitoring software.
- 1994 **Silicon Vertex Detectors**, *Construction the SVX II detector at CDF*, Testing and evaluation of silicon sensors using probe station.
- 1993 **Atomic Force Microscopy**, *Operation of microscope for study of multilayer thin films.*
- 1990-1993 **Thin-film deposition**, *Design of a sputtering plasma magnetron cathode for metal depositions in Argon. Operation of system for multilayer thin-film production using ion-assisted evaporation. Quadrupole ion-trap mass spectrometer installation and operation.*
- 1990-1993 **Ultra-High Vacuum Systems**, *Design and construction of several ultra-high vacuum systems using turbomolecular, cryo and diffusion pumps. Operation of systems with ion pumps.*

Awards

- 2013 **The EPS 2013 High Energy and Particle Physics Prize for an outstanding contribution to High Energy Physics.**
Awarded to the ATLAS and CMS collaborations, "for the discovery of a Higgs boson, as predicted by the Brout-Englert-Higgs mechanism"
- 1994-1998 **Doctoral Degree Fellowship**, *JNICT, EU/Portugal.*
- 1993-1994 **Master Degree Fellowship**, *JNICT, EU/Portugal.*

Selected Publications

Author of over 670 refereed publications as a member of the NA38, CDF and ATLAS Collaborations. Below is a selection of the most relevant publications. These include 39 papers as the ATLAS Standard Model Group convener and 4 papers as the ATLAS Electroweak Subgroup convener. The full publication list can be obtained from my website or from <http://inspirehep.net/author/profile/J.P.B.Guimaraes.da.Costa.1/>

- 2013 "Evidence for the spin-0 nature of the Higgs boson using ATLAS data", ATLAS Collaboration, Phys. Lett. B 726, 120 (2013), arXiv:1307.1432 [hep-ex].
"Measurements of Higgs boson production and couplings in diboson final states with the ATLAS detector at the LHC", ATLAS Collaboration, Phys. Lett. B 726, 88 (2013), arXiv:1307.1427 [hep-ex].
"Measurement of W^+W^- production in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector and limits on anomalous WWZ and $WW\gamma$ couplings", ATLAS Collaboration, Phys. Rev. D 87, 112001 (2013), arXiv:1210.2979 [hep-ex].
- 2012 "A particle consistent with the Higgs Boson observed with the ATLAS Detector at the Large Hadron Collider", ATLAS Collaboration, Science 338, 1576 (2012).
"Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC", ATLAS Collaboration, Phys. Lett. B 716, 1 (2012), arXiv:1207.7214 [hep-ex].
"Combined search for the Standard Model Higgs boson in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector", ATLAS Collaboration, Phys. Rev. D 86, 032003 (2012), arXiv:1207.0319 [hep-ex].
"Search for the Standard Model Higgs boson in the $H \rightarrow WW^{(*)} \rightarrow \ell\nu\ell\nu$ decay mode with 4.7 fb^{-1} of ATLAS data at $\sqrt{s} = 7$ TeV", ATLAS Collaboration, Phys. Lett. B 716, 62 (2012), arXiv:1206.0756 [hep-ex].
"Measurement of the WW cross section in $\sqrt{s} = 7$ TeV pp collisions with the ATLAS detector and limits on anomalous gauge couplings", ATLAS Collaboration, Phys. Lett. B 712, 289 (2012), arXiv:1203.6232 [hep-ex].
"Determination of the strange quark density of the proton from ATLAS measurements of the $W \rightarrow \ell\nu$ and $Z \rightarrow \ell\ell$ cross sections", ATLAS Collaboration, Phys. Rev. Lett. 109, 012001 (2012), arXiv:1203.4051 [hep-ex].
"Measurement of the inclusive W^\pm and Z/γ cross sections in the electron and muon decay channels in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector", ATLAS Collaboration, Phys. Rev. D 85, 072004 (2012), arXiv:1109.5141 [hep-ex].
- 2011 "Measurement of the W^+W^- cross section in $\sqrt{s} = 7$ TeV pp collisions with ATLAS", ATLAS Collaboration, Phys. Rev. Lett. 107, 041802 (2011), arXiv:1104.5225 [hep-ex].
"Measurement of the Muon Charge Asymmetry from W Bosons Produced in pp Collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector", ATLAS Collaboration, Phys. Lett. B701 (2011) 31, arXiv:1103.2929 [hep-ex].
"Studies of the performance of the ATLAS detector using cosmic-ray muons", ATLAS Collaboration, Eur.Phys.J. C71 (2011) 1593, arXiv:1011.6665 [physics.ins-det].
"Measurement of the $t\bar{t}$ Production Cross Section with an *in situ* Calibration of b -jet Identification Efficiency", T. Aaltonen, *et al.*, CDF Collaboration, Phys. Rev. D 83 (2011) 071102, arXiv:1007.4423 [hep-ex].
- 2010 "Measurement of the $W \rightarrow \ell\nu$ and $Z/\gamma^* \rightarrow \ell\ell$ production cross sections in proton-proton collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector", ATLAS Collaboration, JHEP 1012 (2010) 060, arXiv:1010.2130 [hep-ex].

- "Commissioning of the ATLAS Muon Spectrometer with Cosmic Rays", ATLAS Collaboration, Eur. Phys. J. C70 (2010) 875-916, arXiv:1006.4384 [physics.ins-det].
- "Performance of the ATLAS Detector using First Collision Data", ATLAS Collaboration, JHEP 1009 (2010) 056, arXiv:1005.5254 [hep-ex].
- 2008 "ATLAS Muon Drift Tube Electronics", G. Brandenburg, J. Guimarães da Costa *et al.*, J. Instrum. 3 P09001 (2008).
- "The ATLAS Experiment at the CERN Large Hadron Collider", G. Aad *et al.*, ATLAS Collaboration, J. Instrum. 3, S08003 (2008).
- 2006 "Observation of $B_s^0 - \bar{B}_s^0$ Oscillations", A. Abulencia *et al.*, CDF Collaboration, Phys. Rev. Lett. 97, 242003 (2006).
- "Measurement of the $t\bar{t}$ Production Cross Section in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV", A. Abulencia *et al.*, CDF Collaboration, Phys. Rev. Lett. 97, 082004 (2006).
- "Precision Top Quark Mass Measurement in the Lepton + Jets Topology in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV", A. Abulencia *et al.*, CDF Collaboration, Phys. Rev. Lett., 96, 022004 (2006).
- "Top Quark Mass Measurement Using the Template Method in the Lepton + Jets Channel at CDF II", A. Abulencia *et al.*, CDF Collaboration, Phys. Rev. D73, 032003 (2006).
- 2005 "Measurement of the $t\bar{t}$ Production Cross Section in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV using Lepton + Jet Events with Secondary Vertex b -tagging", D. Acosta *et al.*, CDF Collaboration, Phys. Rev. D71, 052003 (2005).
- "The production of ρ , ω and ϕ vector-mesons by protons and sulphur ions with incident momentum of 200 GeV/c per nucleon", M.C. Abreu *et al.*, NA38 Collaboration, Eur. Phys. J. C, 44 375 (2005).
- 2004 "CDF Central Outer Tracker", T. Affolder *et al.*, CDF Collaboration, Nucl. Instrum. Meth. A 526, 249 (2004).
- 2000 "Search for a Fourth-Generation Quark More Massive than the Z^0 Boson in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV", T. Affolder *et al.*, CDF Collaboration, Phys. Rev. Lett. 84, 835 (2000).

Invited Conference Presentations

- Aug 2013 **Rencontre du Vietnam, Inaugural Conference: Windows on the Universe**, ICISE, Quy Nhon, "Status of Electroweak Precision Measurements", Plenary.
- Jul 2013 **US ATLAS Workshop**, Argonne National Lab, "Standard Model Measurements at the LHC", Open Day Plenary.
- Jun 2013 **Fermilab Users Meeting**, Batavia, IL, "Standard Model Results from the LHC", Plenary.
- Jan 2013 **Workshop on Heavy Flavor Production at Hadron Colliders**, UC Berkeley, "Physics Highlights from ATLAS".
- Jan 2013 **Particle Physics in the LHC Era, Zurich Phenomenology Workshop**, University of Zurich/ETH, "Highlights on Standard Model Physics Results from ATLAS".
- Dec 2012 **New Worlds in Particle and Astroparticle Physics**, Lisbon, "Electroweak Physics at the LHC".
- Aug 2012 **QCD@LHC Workshop**, MSU, East Lansing, MI, "W and Z production at ATLAS".
- Jul 2011 **19th Particles & Nuclei International Conference**, MIT, Cambridge, "W, Z and Top... an Overview", Plenary.
- Jul 1999 **Jornadas LIP**, Ericeira, Portugal, " b' Quark: The Next Generation".

Conference Presentations by Collaboration Invitation

- Jul 2012 **36th International Conference for High Energy Physics, Melbourne**, "Electroweak Physics Results", Plenary.
- May 2012 **11th Conference on the Intersections of Particle and Nuclear Physics, St. Petersburg, FL**, "Review of the Electroweak Tests of the Standard Model Parallel Sessions", Plenary.
- Oct 2011 **LPCC Electroweak Working Group Workshop, CERN, Geneva**, "Triple Gauge Bosons at ATLAS".
- Jun 2010 **Physics at LHC 2010, DESY, Hamburg**, "Observation of W and Z Boson Production at 7 TeV with the ATLAS Experiment".
- Oct 2007 **IEEE Nuclear Science Symposium, Honolulu**, "Commissioning and Integration of the ATLAS Muon Spectrometer".
- Jul 2005 **The 2005 European Physical Society Conference on High Energy Physics, Lisbon**, "Top Quark Pair Production Cross Section at $\sqrt{s} = 1.96$ TeV using Lepton+ Jets events at CDF".
- Aug 2004 **32nd International Conference for High Energy Physics, Beijing**, "Top Quark Mass Measurement at the Tevatron".
- Aug 2000 **DPF Meeting, Columbus, OH**, "Standard Model Higgs Combined Result from CDF".
- Mar 1999 **APS Centennial Meeting, Atlanta, GA**, "Search for a Fourth Generation Quark Heavier than the Z Boson".
- Mar 1999 **APS Centennial Meeting, Atlanta, GA**, "The CDF Central Outer Tracker Readout Electronics".
- Apr 1998 **Joint APS/AAPT Meeting, Columbus, OH**, "Search for a Fourth Generation Charge -1/3 Quark Heavier than the Z Boson".

Seminars and Colloquia Presentations

- Dec 2013 **Physics Colloquium, University of Nebraska**, "The Standard Model and its Higgs Boson at the LHC".
- Oct 2013 **Physics Colloquium, Carnegie Mellon University**, "Confronting the Standard Model with the LHC".
- Nov 2012 **Public Lecture, Sesimbra, Portugal**, "A descoberta de uma nova partícula: será o Bosão de Higgs?".
- Feb 2012 **Physics Colloquium, Harvard University**, "The Road to the Higgs Boson".
- Sep 2011 **CERN LHC Seminar, Geneva**, "Diboson production and Standard Model Higgs searches with the ATLAS Detector at the Large Hadron Collider".
- Jul 2011 **Pedagogical Lecture, PANIC, MIT**, "Searching for new Particles".
- Oct 2010 **High Energy Physics Seminar, SLAC National Laboratory**, "First Measurements of Vector Boson Production at LHC".
- Oct 2010 **RPM Seminar, Lawrence Berkeley National Laboratory**, "First Results of W and Z Boson Physics ATLAS".
- Jan 2007 **Physics Colloquium, New University of Lisbon**, "Exploracoes na Fronteira de Alta Energia".
- May 2006 **Physics Colloquium, New York University**, "Collider Physics in the Age of Speculation".
- Apr 2006 **High Energy Physics Seminar, Harvard University**, "Top Quark Production at Hadron Colliders".
- Apr 2006 **High Energy Physics Seminar, New York University**, "Top Quark Production at Hadron Colliders".
- Mar 2006 **High Energy Physics Seminar, University of Massachusetts, Amherst**, "Top Quark Production at Hadron Colliders".
- Mar 2006 **Physics Colloquium, University of Santa Cruz**, "What's So Special About the Top Quark?".

- Mar 2006 **High Energy Physics Seminar**, *University of Santa Cruz*, "Top Quark Production at Hadron Colliders".
- Feb 2006 **High Energy Physics Seminar**, *University of Illinois at Chicago*, "Top Quark Production at Hadron Colliders".
- Jan 2006 **Physics Colloquium**, *University of British Columbia*, "Top Quark Physics at Hadron Colliders".
- Jan 2006 **High Energy Physics Seminar**, *University of Wisconsin*, "Top Quark Physics at Hadron Colliders".
- Jun 2005 **High Energy Physics Seminar**, *Laboratorio de Instrumentacao e Fisica Experimental, Lisbon*, "Latest Top Physics Results from CDF".
- Mar 2005 **High Energy Physics Seminar**, *University of California, Irvine*, "Top Quark, the Teenage Years".
- Dec 1999 **High Energy Physics Seminar**, *Harvard University*, "*b'* Quark: The Next Generation".
- Nov 1999 **High Energy Physics Seminar**, *Rochester University*, "*b'* Quark: The Next Generation".
- Nov 1999 **High Energy Physics Seminar**, *University of Pennsylvania*, "*b'* Quark: The Next Generation".
- Oct 1999 **LNS Journal Club Seminar**, *Cornell University*, "*b'* Quark: The Next Generation".
- Oct 1999 **High Energy Physics Seminar**, *Princeton University*, "*b'* Quark: The Next Generation".
- Oct 1999 **High Energy Physics Seminar**, *Rutgers University*, "*b'* Quark: The Next Generation".
- Jul 1999 **High Energy Physics Seminar**, *Ohio State University*, "*b'* Quark: The Next Generation".

Lectures at Particle Physics Schools

- Dec 2012 **First Results from the Large Hadron Collider, Heraeus-Seminar**, *Physikzentrum Bad Honnef, Germany*, "Electroweak Physics at the LHC".
- Oct 2012 **Proton Structure in the LHC Era**, *DESY, Hamburg*, "LHC Measurements Sensitive to the Proton Structure".
- Aug 2006 **New England Particle Physics Student Retreat**, *Cape Cod, MA*, "Physics at Hadron Colliders".

Conference and Workshop Organization

- Sep 2013 **ATLAS Standard Model Workshop**, *Harvard*, Organizer and convener.
- Apr 2013 **Working Group on Electroweak Precision Measurements at the LHC**, *LHC Physics Centre at CERN*, Co-convener .
- Mar 2013 **Rencontres de Moriond, QCD and High Energy Interactions**, *La Thuille*, Chair of one session on the Higgs Boson.
- Oct 2012 **Working Group on Electroweak Precision Measurements at the LHC**, *LHC Physics Centre at CERN*, Co-convener .
- Jun 2012 **11th Conference on the Intersections of Particle and Nuclear Physics**, *St. Peterburg, FL*, Convener of the session on Electroweak Tests of the Standard Model.
- May 2012 **Working Group on Electroweak Precision Measurements at the LHC**, *LHC Physics Centre at CERN*, Co-convener .
- Nov 2011 **Working Group on Electroweak Precision Measurements at the LHC**, *LHC Physics Centre at CERN*, Co-convener .

Other Professional Responsibilities

- 2010-2011 **Co-convenor of the ATLAS W/Z Physics and Electroweak Common Tools Group.**
Responsible for the development of common tools and characterization measurement to be used for all standard model analysis involving W and Z bosons.
- 2010-2011 **Co-convenor of the ATLAS Standard Model W/Z Muon Performance Group.**
Responsible for the development of common tools and performance measurement for the standard model analyses involving W and Z bosons decaying into muons.
- 2010-Present **Member of ATLAS Muon Spectrometer Steering Group.**
Management team of the ATLAS Muon Spectrometer. Representative for the Muon Physics Analysis.
- 2008-2010 **Member of ATLAS Muon Spectrometer Steering Group.**
Management team of the ATLAS Muon Spectrometer. Representative for the Monitored Drift Tube (MDT) Endcap System and the MDT electronics.
- 2008-Present **Member of ATLAS Muon Spectrometer Institutional Board.**
Representative of the Harvard Group at the Muon Institutional Board meetings.

Graduate Students Mentorship

- 2016 Mr. Tomo Lazovich (expected graduation)
- 2014 Mr. William Spearman; Thesis: Measurement of the Higgs Mass with the ATLAS Detector (expected graduation)
- 2011 Dr. Srivas Prasad; Thesis: Measurement of W Production Cross Section in Proton-Proton Collisions at $\sqrt{s} = 7$ TeV with the ATLAS Detector.
- 2011 Dr. Verena Martinez Outschoorn; Thesis: Measurement of the W Charge Asymmetry in Proton-Proton Collisions at $\sqrt{s} = 7$ TeV with the ATLAS Detector.
- Others, not as main mentor:
- Dr. Lashkar Kashif, Dr. Giovanni Zevi Della Porta, Dr. Michael Kagan, Dr. Ben Smith, Dr. Daniel Sherman, Ms. Chin Lin Wong, Prof. Salvatore Rappoccio, Prof. Ayana Holloway

Postdocs Mentorship

- Dr. Hugh Skottowe (current postdoctoral fellow)
- Dr. Alberto Belloni (now professor at University of Maryland)
- Dr. Shulamit Moed (now Tenure-Track Scientist at Fermilab)
- Others, not as main mentor:
- Dr. Corrinne Mills, Dr. Geraldine Conti, Dr. Pierluigi Catastini, Dr. Sebastian Grinstein, Dr. Kevin Black

Undergraduate Students Research Mentorship

- Mr. Jee Woo Park (now graduate student at MIT)
- Mr. Jack Kearney (now graduate student at University of Michigan)
- Ms. Maria Baryakhtar (now graduate student at Stanford University)
- Mr. Maximillian Swiatlowski (now graduate student at Stanford University)
- Mr. Tomo Lazovich (now graduate student at Harvard University)
- Mr. Daniel Pershey (now graduate student at Caltech)
- Mr. Jamie Law-Smith (now senior at Harvard College)
- Others, not as main mentor:
- Mr. Ben Burns, Mr. Edward Henry, Mr. Curt Nehr Korn