

# Rebeca Gonzalez Suarez

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## Current position

*Adjunct Research Associate* at the University of Nebraska, Lincoln, US since Nov. 1st 2012

## Previous positions

- 2010-2012 Post-doctoral fellow at the Vrije Universiteit Brussel (VUB), Brussels [Belgium]
- 2006-2010 PhD Student with an FPI grant at Instituto de Fisica de Cantabria (IFCA), Santander [Spain]

## Education

- 2010 PH.D at the University of Cantabria, Santander [Spain]
- 2007 D.E.A, Diploma de Estudios Avanzados at the University of Cantabria, Santander [Spain]
- 2005 Degree in Fundamental Physics at the Universidad de Oviedo, Oviedo [Spain]

## Theses

- 2010 PH.D THESIS (9 Sep.)  
*Search for a SM Higgs Boson in the LHC with the CMS experiment using the  $H \rightarrow WW^* \rightarrow 2\mu 2\nu$  decay channel*  
Supervisors: J. Cuevas and T. Anoro.
- 2007 Diploma de Estudios Avanzados (21 Dec.)  
*Search for a Higgs boson in CMS in the  $H \rightarrow WW^* \rightarrow 2\mu 2\nu$  decay channel*  
Supervisors: J. Cuevas and T. Anoro.

## Positions of Responsibility

- 2015-2017 **Higgs to WW convener:** Coordinator of the Higgs to WW physics in the CMS experiment, covering all analyses studying the decay of the Higgs in two W bosons, independently of the production mode. Level 3 management within the CMS collaboration (Higgs group)
- 2013-2014 **Single Top convener:** Coordinator of single-top-quark related physics in the CMS experiment. Level 3 management within the CMS collaboration (Top group)  
**Editor** and contact of the publications arXiv:1411.3441 (PRD), and arXiv:1209.3489 (PRL); and of other public documents (TOP-11-022, HIG-14-012)
- 2014-2015 **Contact person** person for the simulation in the Higgs to WW subgroup
- 2011-2012 **Contact person** and developer of the local reconstruction of the Strip Tracker
- 2011-2012 **Contact person** for the High Level Trigger - Strip Tracker
- 2015 **Run Field Manager** coordinating during two weeks the operations of the CMS experiment, operating as the link between the shift crews and Run coordination

## Participation in Thesis Boards

- 2015 **PhD thesis committee** (20th March) at Uppsala University [Sweden]  
Thesis Title: *Search for a Charged Higgs Boson in ATLAS and Development of Novel Technology for Future Particle Detector Systems*  
by Daniel Pelikan

2013 **Master thesis promotor** (24 June) at the Vrije Universiteit Brussel [Belgium]  
Thesis Title: *Measurement of the single top  $tW$  associated production in the dilepton decay channel in proton proton collisions at a center of mass energy of 8 TeV*  
by Isis Marina Van Parijs

## Seminars

2015 **Seminar at Stony Brook University**  
17 December, Stony Brook, NY [United States]  
*Top quark and Higgs boson physics at the LHC*

**Wine & Cheese: Fermilab Joint Experimental - Theoretical Physics Seminar**  
20 November, Batavia, IL [United States]  
*Recent Results from CMS on Top and Higgs*

**LPC Physics Forum**  
13 August, Fermilab, Batavia IL [United States]  
 *$H \rightarrow WW$  at CMS*

**Seminar at the University of Nebraska, Lincoln**  
10 August, University of Nebraska, Lincoln NE [United States]  
*Higgs boson decays to  $WW$  at CMS*

**Seminar at University of Goettingen, II. Physikalisches Institut**  
19th June, Goettingen [Germany]  
*Overview of single top physics in CMS with Run-1 data*

**Seminar at the Universite Catholique de Louvain**  
18th March, Louvain la Neuve [Belgium]  
*Is it the Higgs? Characterization of the  $H(125)$  resonance (spin, parity, tensor structure) with leptonic  $WW$  decays*

**Seminar at the EPFL Lausanne**  
2d of March, Lausanne [Switzerland]  
*Overview of single top physics in CMS with Run-1 data*

2014 **CERN Collider Cross Talk**  
27 November, CERN [Switzerland]  
 *$H \rightarrow WW$  from ATLAS and CMS*

**LHC seminar**  
25 February, CERN [Switzerland]  
*Recent top physics results from CMS*

2013 **Seminar at Uppsala University** 10 October, Uppsala [Sweden]  
*Overview of single top results at the LHC*

## Conferences

2015 **DPF2015:** Meeting of the Division of Particles and Fields of the American Physical Society  
Parallel Talk: *Run-1 Single-top measurements at CMS*  
4-8 Aug, University of Michigan, Ann Arbor, MI [United States]

**SM@LHC:** Standard Model at LHC  
Plenary Talk: *LHC results on Spin, Anomalous Couplings, and CP structure*  
21-24 April, Galileo Galilei Institute, Florence [Italy]

- 2014 **Second CMS Single Top Workshop**  
Scientific Program and Talk: *Lessons learned from Run1 and future prospects*  
4-5 December, Palazzo Alabardieri, Naples [Italy]  
**LHCP 2014:** The Second Large Hadron Collider Physics conference  
Chair of the TOP Parallel sessions  
2-7 June, New York City [United States]
- 2013 **CMS Single Top Workshop**  
Scientific Program and Closing Talk: *Next steps and summary*  
19-20 December, Palazzo Alabardieri, Naples [Italy]  
**TOP2013:** 6th International Workshop on Top Quark Physics  
Plenary Talk *Inclusive single top cross section at the LHC*  
4-19 September, Durbach [Germany]
- 2012 **4th generation and single-top:** Workshop on fourth fermion generation and on single-top production  
Invited Talk: *tW production at CMS*  
26-28 March, Leinsweiler [Germany]  
**Rencontres de Moriond** QCD and High Energy Interactions  
Plenary Talk: *Single Top Production at  $\sqrt{s} = 7\text{TeV}$*   
10-17 March, La Thuile [Italy]
- 2010 **II CPAN days:** Segundas Jornadas del CPAN  
Invited Plenary Talk: *Higgs and SUSY searches in CMS*  
29-30 November, Valencia [Spain]  
**BEACH 2010** IX International Conference on Hyperons, Charm and Beauty Hadrons  
Plenary Talk: *Higgs Search Prospects at the LHC*  
Chair of the session: Heavy Flavor Decays and Properties - I  
21-26 June, Perugia [Italy]
- 2009 **PASCOS 2009:** 15th International Symposium on Particles Strings and Cosmology  
Parallel Talk: *EW symmetry breaking at the LHC*  
6-10 July, Hamburg [Germany]
- 2008 **ICHEP08:** 34th International Conference on High Energy Physics  
Poster: *Discovery Potential for the SM Higgs Boson in the  $H \rightarrow WW^* \rightarrow 2l2\nu$  channel at the LHC*  
July 29 - August 5, Philadelphia, Pennsylvania [United States]
- 2007 **CHEP07:** International Conference on Computing in High Energy and Nuclear Physics  
Poster (co-author): *A software and computing prototype for CMS Muon system alignment*  
2-7 September, Victoria BC [Canada]

## Membership of Analysis Review Committees

- 2015
- ◇ *Search for the associated production of a Higgs boson with a single top quark in proton-proton collisions at  $\sqrt{s} = 8\text{ TeV}$*  arXiv:1509.08159, Sub. to JHEP
  - ◇ *Measurement of the top-quark mass from the b jet energy spectrum* TOP-15-002 [Chair]
  - ◇ *Measurement of the charge asymmetry in top quark pair production in pp collisions at  $\sqrt{s} = 8\text{ TeV}$  using a template method* arXiv:1508.03862, Accepted Phys. Rev. D
  - ◇ *Measurement of the W boson helicity using  $t\bar{t}$  events in the dilepton final state at  $\sqrt{s} =$*

## 8 TeV TOP-14-017 [Chair]

- ◇ *Search for a standard model Higgs boson produced in association with a top-quark pair and decaying to bottom quarks using a matrix element method* arXiv:1502.02485 Eur. Phys. J. C 75 (2015) 251
- ◇ *Search for monotop signatures in proton-proton collisions at  $\sqrt{s} = 8$  TeV* arXiv:1410.1149 Phys. Rev. Lett. 114, 101801 (2015) [Chair]
- 2014 ◇ *Search for  $t\bar{t}H$  events in the  $H \rightarrow b\bar{b}$  final state using the Matrix Element Method* HIG-14-010
- ◇ *Searches for electroweak production of charginos, neutralinos, and sleptons decaying to leptons and W, Z, and Higgs bosons in pp collisions at 8 TeV* arXiv:1405.7570, EPJC 74 (2014) 3036
- ◇ *Search for new physics with monotop final states in pp collisions at  $\sqrt{s} = 8$  TeV* B2G-12-022 [Chair]
- ◇ *Search for associated production of a single top quark and a Higgs boson in events where the Higgs boson decays to two photons at  $\sqrt{s} = 8$  TeV* HIG-14-001
- 2013 ◇ *Projections for Top FCNC Searches in  $3000\text{ fb}^{-1}$  at the LHC* FTR-13-016
- ◇ *Sensitivity study of the prospects for searching for heavy vector-like charge 2/3 quarks at  $\sqrt{s} = 14$  TeV with the upgraded CMS detector* FTR-13-026
- ◇ *Projected improvement of the accuracy of top-quark mass measurements at the upgraded LHC* FTR-13-017
- ◇ *CMS reach in  $B_s^0 \rightarrow \mu^+\mu^-$  and  $B^0 \rightarrow \mu^+\mu^-$  branching fractions for the new LHC runs* FTR-13-022
- ◇ *Search for electroweak production of charginos and neutralinos using leptonic final states* SUS-13-006
- ◇ *Search for electroweak production of charginos, neutralinos and sleptons using leptonic final states in pp collisions at  $\sqrt{s} = 8$  TeV* SUS-12-022
- 2012 ◇ *Search for electroweak production of charginos and neutralinos using leptonic final states in pp collisions at  $\sqrt{s} = 7$  TeV* arXiv:1209.6620, JHEP 1211 (2012) 147
- ◇ *Search for physics beyond the standard model in events with a Z boson, jets, and missing transverse energy in pp collisions at  $\sqrt{s} = 7$  TeV* arXiv:1204.3774, Physics Letters B 716 (2012) 260-284
- 2011 ◇ *Search for Physics Beyond the Standard Model in Z+MET+Jets events at the LHC* SUS-11-019

## Selected Journal articles

Ordered: PA = Primary Author; ED = Editor; C = Contributor; R = Review; P = Proceedings

- 2015 ◇ CMS Collab. *Constraints on the spin-parity and anomalous HVV couplings of the Higgs boson in proton collisions at 7 and 8 TeV* arXiv:1411.3441, Phys. Rev. D 92, 012004 [PA-ED]
- 2014 ◇ CMS Collab. *Observation of the associated production of a single top quark and a W boson in pp collisions at  $\sqrt{s} = 8$  TeV*, arXiv:1401.2942, Phys. Rev. Lett. 112, 231802. [PA]
- ◇ CMS Collab. *Measurement of Higgs boson production and properties in the WW decay channel with leptonic final states*, arXiv:1312.1129, JHEP 01(2014)096 [PA]

- 2013      ◇ CMS Collab. *Evidence for associated production of a single top quark and W boson in pp collisions at 7 TeV*, arXiv:1209.3489, Phys. Rev. Lett. 110, 022003 (2013) [PA-ED]
- 2015      ◇ CMS Collab. *Search for the associated production of a Higgs boson with a single top quark in proton-proton collisions at  $\sqrt{s} = 8$  TeV*, arXiv:1509.08159, Sub. to JHEP [C-R]
- ◇ CMS Collab. *Precise determination of the mass of the Higgs boson and tests of compatibility of its couplings with the standard model predictions using proton collisions at 7 and 8 TeV*, arXiv:1412.8662, Eur. Phys. J. C 75 (2015) 212 [C]
- 2013      ◇ *Snowmass 2013 Top quark working group report*, arXiv:1311.2028 [C]
- 2012      ◇ CMS Collab. *Search for the standard model Higgs boson decaying to a W pair in the fully leptonic final state in pp collisions at  $\sqrt{s} = 7$  TeV*, arXiv:1202.1489, Phys.Lett. B 710 (2012) 91-113 [C]
- 2011      ◇ CMS Collab. *Measurement of the  $t\bar{t}$  Production Cross Section in pp Collisions at 7 TeV in Lepton + Jets Events Using b-quark Jet Identification*, arXiv:1108.3773, Phys.Rev. D84 (2011) 092004 [C]
- ◇ CMS Collab. *Measurement of  $W^+W^-$  Production and Search for the Higgs Boson in pp Collisions at  $\sqrt{s} = 7$  TeV*, arXiv:1102.5429, Phys.Lett. B 699 (2011) 25-47 [C]
- 2015      ◇ CMS Collab. *Search for s channel single top quark production in pp collisions at  $\sqrt{s} = 7$  and 8 TeV*, arXiv:1603.02555, Submitted to J. High Energy Phys [R - Single Top]
- 2015      ◇ CMS Collab. *Search for anomalous single top quark production in association with a photon in pp collisions at  $\sqrt{s} = 8$  TeV*, arXiv:1511.03951, Submitted to J. High Energy Phys [R - Single Top]
- ◇ CMS Collab. *Measurement of top quark polarisation in t-channel single top quark production*, arXiv:1511.02138, Submitted to J. High Energy Phys [R - Single Top]
- ◇ CMS Collab. *Measurement of the W boson helicity in events with a single reconstructed top quark in pp collisions at  $\sqrt{s} = 8$  TeV*, arXiv:1410.1154, JHEP01(2015)053 [R - Single Top]
- 2014      ◇ CMS Collab. *Measurement of the t-channel single-top-quark production cross section and of the  $|V_{tb}|$  CKM matrix element in pp collisions at  $\sqrt{s} = 8$  TeV*, arXiv:1403.7366, JHEP 06 (2014) 090 [R - Single top]
- 2015      ◇ *Run-1 Single-top measurements at CMS*, Proceedings DPF 2015, arXiv:1510.05235 [P]
- 2014      ◇ *Inclusive single top cross section at the LHC*, Proceedings TOP 2013, DOI:10.3204/DESY-PROC-2014-02/16 [P]
- 2012      ◇ *Single top Production at  $\sqrt{s} = 7$  TeV*, Proceedings Moriond 2012, arXiv:1205.2786 [P]
- 2010      ◇ *Higgs search prospects at the LHC*, Proceedings BEACH 2010, Nucl.Phys.Proc.Suppl. 210-211 (2011) 283-288 [P]
- 2008      ◇ *Discovery Potential for the SM Higgs Boson in the  $H \rightarrow WW^* \rightarrow 2l2\nu$  channel at LHC*, Proceedings ICHEP 2008, arXiv:0810.1468 [P]
- ◇ *A Software and Computing prototype for CMS Muon System alignment*, Proceedings CHEP 2007, Journal of Physics: Conference Series 119 (2008) 072008 [P]

## Selected Public Results

Ordered: PA = Primary Author; ED = Editor; C = Contributor; R = Review

- 2014 ◇ *Constraints on Anomalous HWW Interactions using Higgs boson decays to  $W+W^-$  in the fully leptonic final state* - HIG-14-012 [PA- ED]
- 2012 ◇ *Observation of Associated Production of a Single Top Quark and W Boson in pp Collisions at  $\sqrt{s} = 8\text{TeV}$*  - TOP-12-040 [PA]
- 2011 ◇ *Search for single top tW associated production in the dilepton decay channel in pp collisions at  $\sqrt{s} = 7\text{TeV}$*  - TOP-11-022 [PA- ED]
- 2010 ◇ *Performance of muon identification in pp collisions at  $\sqrt{s} = 7\text{TeV}$*  - MUO-10-002 [PA]
- 2008 ◇ *Search Strategy for a Standard Model Higgs Boson Decaying to Two W Bosons in the Fully Leptonic Final State'* - HIG-08-006 [PA]
- 2007 ◇ *Search for the Higgs boson in the  $WW$  decay channel with the CMS experiment'* - HIG-07-001 [PA]
- 2015 ◇ *Measurements of the Higgs boson production and decay rates and constraints on its couplings from a combined ATLAS and CMS analysis of the LHC pp collision data at  $\sqrt{s}=7$  and  $8\text{TeV}$*  - HIG-15-002 [C]
- 2014 ◇ *Search for  $H \rightarrow b\bar{b}$  in association with single top quarks as a test of Higgs boson couplings* - HIG-14-015 [C]
- 2014 ◇ *Combination of cross-section measurements of associated production of a single top-quark and a W boson at  $\sqrt{s} = 8\text{TeV}$  with the ATLAS and CMS experiments* - TOP-14-009 [C-R Single top]
- 2014 ◇ *Constraints on anomalous HVV interactions using  $H$  to  $4l$  decays* - HIG-14-014 [C]
- 2011 ◇ *Measurement of the top-quark pair-production cross section in the lepton+jets channel with the use of b-tagging* - TOP-10-003 [C]
- 2010 ◇ *Search for  $H \rightarrow WW \rightarrow 2l\ 2\nu$*  - HIG-10-003 [C]
- 2010 ◇ *Observation of  $WW$  final state* - EWK-10-009 [C]
- 2015 ◇ *Measurement of the transverse momentum spectrum of the Higgs boson produced in pp collisions at  $\sqrt{s} = 8\text{TeV}$  using the  $H \rightarrow WW$  decays* - HIG-15-010 [R - Higgs to WW]
- 2014 ◇ *Measurements of the differential cross section of single top-quark production in the t channel in proton-proton collisions at  $\sqrt{s} = 8\text{TeV}$*  - TOP-14-004 [R - Single top]
- 2014 ◇ *Search for anomalous Wtb couplings and top FCNC in t-channel single-top-quark events* - TOP-14-007 [R - Single top]
- 2014 ◇ *Search for anomalous single top quark production in association with a photon* - TOP-14-003 [R - Single top]
- 2013 ◇ *Search for s-channel single top-quark production in pp collisions at  $\sqrt{s} = 8\text{TeV}$*  - TOP-13-009 [R - Single top]
- 2013 ◇ *Measurement of top quark polarization in t-channel single-top production* - CMS-PAS-TOP-13-001 [R - Single top]
- 2013 ◇ *Combination of single top-quark cross-sections measurements in the t-channel at  $\sqrt{s} =$*

8TeV with the ATLAS and CMS experiments - TOP-12-002 [R - Single top]

◊ *Search for Flavor-Changing Neutral Currents in tZ events in proton-proton collisions at  $\sqrt{s} = 7\text{TeV}$*  - TOP-12-021 [R - Single top]

◊ *Measurement of the single-top t-channel charge ratio at 8 TeV* - TOP-12-038 [R - Single top]

◊ *Measurement of W-helicity fractions in single top events topology* - TOP-12-020 [R - Single top]

There are more publications and results of which I am also an author. For details consult my publication list.

## Outreach Activities

- **Official CERN** and **CMS guide** with more than 100 visits underground, including virtual visits for international audiences
- **CERN contact** of the Expanding your horizons (EYH) event in Geneva: 2015-2013. Organizer of the 4 CERN workshops. Workshop leader of the *Build your own accelerator* session in 2015
- Workshop leader of the *Questions without answers at the LHC* session in the EYH event in Geneva in 2011
- **Moderator** of the International Masterclasses by the International Particle Physics Outreach Group (IPPOG) (2015-2016)
- CMS Guide, school@CMS (2016-2015)
- *Ask a scientist* in the night of the Researchers (FNAC Rive Geneva 2014, FNAC Ballexert Geneva 2015)
- CMSVoices Twitter account of February 2016
- Role in the official CERN LHC Season 2 videos [link] (2015)
- Speaking role in the videos advertising the US contribution to the CMS Experiment [link] (2014)
- Contributions to the CMS blog: *the Cylindrical Onion*
- Contributions to the IPPOG website
- Spanish subtitles for the CMS introduction video, [link]
- Personal blog with CERN pictures, *lonelychairsatcern.tumblr.com* (20K followers)
- *Particle Fever* movie meet and greet in the University of Columbia (NY) (2014)
- Guest speaker at ENP Ferney for gender awareness training (2012)

## Other Activities

CMS detector operation tasks: Offline Drift Tube muon chambers (DT) (2008), DT online (2009), DT on-call (2010), Detector Control Safety (DCS) (2010-2011), **Shift Leader** (2012-today) shifts, and **Run Field Manager** (2015)

Rebeca Gonzalez Suarez, March 9, 2016