Rebeca Gonzalez Suarez

ORCID: 0000-0002-6126-7230 | ResearcherID: L-6128-2014

Current position

2018- Associate Professor (Docent) at the Department of Physics and Astronomy, High Energy Physics, *Uppsala University*, Researcher funded by an individual Starting Grant from the Swedish Research Council.

Previous positions

- 2012-2018 Adjunct Research Associate, University of Nebraska, Lincoln, US.
- 2010-2012 Post-doctoral fellow, Vrije Universiteit Brussel (VUB), BE.
- 2006-2010 **PhD Student**, Instituto de Fisica de Cantabria (IFCA), ES.

Education

- 2020 **Docent**, (14 January), Uppsala University, SE.
- 2010 Ph.D, (9 September), University of Cantabria, ES.
- 2007 **DEA, Diploma de Estudios Avanzados**, *University of Cantabria*, ES.
- 2005 Degree in Fundamental Physics, Universidad de Oviedo, ES.

Ph.D Thesis

title 'Search for the SM Higgs Boson in the $H \to WW^* \to 2\mu 2\nu$ decay channel at the CMS experiment of the LHC' [link]

supervisors J. Cuevas and T. Anoro

International Collaborations

- 2018- Member of the ATLAS Collaboration at CERN
- 2006-2018 Member of the CMS Collaboration at CERN

Grants and awards

- 2018 **Vetenskapsrådet Starting Grant**, *Swedish Research Council, Individual (VR 2017-05092)*, Uppsala University, SE.
- 2017 **Future Fellowship Grant**, Australian Research Council, Individual (FT170100088), University of Adelaide, AU.

Coordination, Leadership

- **Top convener**. Coordinator of the top quark Physics Analysis Group of the CMS experiment. Level 2 management within the CMS collaboration. Physics coordination. [2016-2018]
- **Higgs to WW convener**. Coordinator of the Higgs to WW physics in the CMS experiment. Level 3 management within the CMS collaboration. Higgs group. [2015-2016]
- **Single Top convener**. Coordinator of single-top-quark related physics in the CMS experiment. Level 3 management within the CMS collaboration. Top group. [2013-2014]
- Run Field Manager. Coordinating the operations of the CMS experiment on-site in LHC point 5, link between the shift crews and Run coordination. [2015-2017]

Other responsibilities

• Member of the Advisory Committee of CERN Users (ACCU), representing the Swedish User community [2020-]

- Seminar organizer. Weekly seminars in Nuclear and Particle physics at the Physics and Astronomy Department, Uppsala University [2019-]
- Member of the steering panel of Art@CMS [2017-2018]
- o Contact person. Monte Carlo Simulation, Higgs to WW subgroup, CMS experiment. [2014-2015]
- Contact person. Local reconstruction of the Strip Tracker, CMS experiment. [2011-2012]
- o Contact person. High Level Trigger for the Strip Tracker, CMS experiment. [2011-2012]
- Editor and CMS analysis contact of arXiv:1411.3441 (PRD), arXiv:1209.3489 (PRL), TOP-11-022, and HIG-14-012.

Reviewing activities

- Editorial Boards. Member of an ongoing editorial board in the ATLAS experiment. [2019-]
- Analysis Review Committees. Member of 22 internal editorial boards in the CMS experiment, chair of 6 of them. Most appointed postdoc in this kind of committees in CMS at the time. [2011-2016]
- External Reviewer for research grants submitted to different funding programs in Europe (France, Belgium, UK and Republic of Ireland), Asia (Hong-Kong), and Oceania (Australia). [2016-]
- Referee. European Physical Journal C. [2018-]

Supervision of students

- PhD supervisor Olga Sunneborn Gudnadottir, Uppsala University (2019-2023)
- MSc supervisor
 - Olga Sunneborn Gudnadottir, Uppsala University (2019)
 - Isis Marina Van Parijs, Vrije Universiteit Brussel (2013)
- CERN summer student supervisor Isis Marina Van Parijs (2012) Ivan Shvetsov (2013)

Teaching

- 2019- **Modern Physics (5.0c) [1TE078]**, *Teacher: lectures, problem solving sessions, exam*, Department of Engineering Sciences Uppsala University, SE.
- 2019 HASCO2019 Summer School, Teacher: Introduction, (21- 26 July) University of Goettingen, DE.
- 2019 PIER Graduate Week, Speaker: Scientific colloquium, (23 26 Sep) DESY, Hamburg, DE.

Formal pedagogic training

- Supervising Students for Degree Projects. March April 2019, Uppsala University (SE). (2 weeks).
- Academic Teacher Training Course. September October 2018, Uppsala University (SE). (5 weeks).
- Supervising PhD Students. September December 2018, Uppsala University (SE). (3 weeks).
- **Supervising student presentations in theory and in practice**. 27-29 August 2018, Uppsala University (SE). (2,5 days).
- Student-centered teaching and learning. 4 December 2018, Uppsala University (SE). (3 hours).

Participation in Thesis Boards

2019 External Examiner at viva, (15th - September), University of Glasgow, UK.

'Boosting to the Top: Measurements of Boosted Top Quarks and Higgs Bosons with the ATLAS Detector at the Large Hadron Collider' by Michael James Fenton.

2019 **PhD thesis committee**, (13th - September), Universidad de Oviedo, ES.

'Study of processes with a pair of top-antitop Quarks and missing transverse energy in the final state in proton-proton collisions with the CMS detector at the Run 2 of the LHC' by Juan Rodrigo Gonzalez Fernandez.

2018 **PhD thesis committee**, (13th - December), Uppsala University, SE.

'Isomeric yield ratio measurements with JYFLTRAP: In quest of the angular momentum of the primary fragments' by Vasileios Rakopoulos. **Chair person** of the examination committee.

2018 **PhD thesis committee**, *(9th November - 18th December)*, Bristol University, UK; and Vrije Universiteit Brussel, BE.

'Precision measurements of differential $t\bar{t}$ production cross sections as a function of kinematic event variables at 13 TeV at CMS' by Douglas John Paul Burns.

2018 PhD thesis committee, (12th October), Uppsala University, SE.

'Enhancing the performance of the Digital Cherenkov Viewing Device - Detecting partial defects in irradiated nuclear fuel assemblies using Cherenkov light' by Erik Branger.

2018 **PhD thesis committee**, (19th March), Vrije Universiteit Brussel, BE.

'Direct measurement of the top quark decay width in the muon+jets channel using the CMS experiment at the LHC' by Lieselotte Moreels.

2016 **PhD thesis committee**, (16th September), IUT de Colmar, FR.

'Recherche d'événements monotop dans le canal leptonique avec l'expérience CMS du LHC' by Michael Buttignol.

2015 **PhD thesis committee**, (20th March), Uppsala University, SE.

'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), Vrije Universiteit Brussel, BE.

'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

2019 **Université Catholique de Louvain**, 'A Hardware Track Trigger for ATLAS at the HL-LHC', (24 October), Louvain-la-Neuve, BE.

University of Texas at Austin, 'A Hardware Track Trigger for ATLAS at the HL-LHC', (15 July), Austin TX, US.

- 2018 Uppsala University, 'At the top of the Large Hadron Collider', (6 September), Uppsala, SE.
- 2017 Workshop on top physics at the LC 2017, 'Recent LHC results', (8 of June), CERN, CH.

University at Albany, 'It is not lonely at the top: studying the heaviest quark at the LHC', (16 of February), Albany, NY, US.

University of Kansas, 'It is not lonely at the top: studying the heaviest quark at the LHC', (23 January), Lawrence, KS, US.

2016 **University of Zurich**, 'Top quark physics in Run 2 with the CMS experiment', (5 December), Zurich, CH.

UK HEP Forum, 'Top physics', (3 November), Abingdon, UK.

Teilchenkolloquium - Particle Physics Colloquium at University of Heidelberg, 'Top quark physics at 13 TeV with the CMS experiment at the LHC', (5 July), Heidelberg, DE.

2015 **Stony Brook University**, 'Top quark and Higgs boson physics at the LHC', (17 December), Stony Brook, NY, US.

Wine & Cheese: Fermilab Joint Experimental - Theoretical Physics Seminar, 'Recent Results from CMS on Top and Higgs', (20 November), Fermilab Batavia, IL, US.

LPC Physics Forum, '*H*→*WW at CMS*', (13 August), Fermilab Batavia, IL, US.

University of Nebraska, Lincoln, 'Higgs boson decays to WW at CMS', (10 August), Lincoln NE, US.

University of Goettingen, II. Physikalisches Institut, 'Overview of single top physics in CMS with Run-1 data', (19 June), Goettingen, DE.

Université Catholique de Louvain, 'Is it the Higgs? Characterization of the H(125) resonance (spin, parity, tensor structure) with leptonic WW decays', (18 March), Louvain-la-Neuve, BE.

EPFL Lausanne, 'Overview of single top physics in CMS with Run-1 data', (2 March), Lausanne, CH.

- 2014 **CERN Collider Cross Talk**, 'H→WW from ATLAS and CMS', (27 November), CERN, CH. **LHC seminar**, 'Recent top physics results from CMS', (25 February), CERN, CH.
- 2013 Uppsala University, 'Overview of single top results at the LHC', (10 October), Uppsala, SE.

Conferences

- 2020 **Spaatind 2020: The 26th Nordic Particle Physics Meeting**, *Talk: 'To catch a long-lived particle'*, 2-7 Jan, Skeikampen, NO.
- 2019 Searching for long-lived particles at the LHC: Sixth workshop of the LHC LLP Community, Organizing committee and chair of the trigger session, 27-29 Nov, Ghent, BE.
- 2018 **CHARGED2018: Prospects for Charged Higgs Discovery at Colliders**, *Organizing committee and chair of the proceedings*, *25-28 Sep*, Uppsala, SE.
 - **IMFP 2018 XLVI International Meeting on Fundamental Physics**, *Invited Talk: 'Top Quark Physics Summary'*, (9-13 April), Salamanca, ES.
 - **Aspen 2018 The Particle Frontier**, *Plenary Talk: 'LHC results on Top Quark Physics'*, (25-31 March), Aspen, CO, US.
 - **Top Quark Physics at the Precision Frontier**, *Chair of the workshop*, (16-19 Jan), Fermilab Batavia, IL. U.S.
- 2017 **Top! Hammertime (a CMS top quark workshop)**, *Chair of the workshop*, *(14-15 Nov)* CERN, CH.
 - **TOP2017:** $10^{\rm th}$ International Workshop on Top Quark Physics, Member of the International Advisory Committee and Chair of the session: Differential Top Quark Pair Production, (17-22 Sep), Braga, PT.
 - LHCP 2017: The Fifth Annual Large Hadron Collider Physics conference, Chair of the TOP Parallel sessions, (14-20 May), Shanghai Jiao Tong University, CN.
- 2016 **top at 100** fb^{-1} , Chair of the workshop , (8-9 Nov) CERN, CH.
 - **TOP2016: 9th International Workshop on Top Quark Physics**, *Chair of the session: Latest Results from ATLAS and CMS*, (19-23 Sep.), Olomuc, CZ.
 - **Third CMS Single Top Workshop**, *Organizing Committee, Scientific Program*, (2-3 Jun), Strasbourg, FR.
 - APS April 2016: American Physical Society April Meeting 2016, Invited Plenary Talk: 'Higgs Physics at the LHC', (16-19 Apr), Salt Lake City, UT, US.
- 2015 **DPF2015:** Meeting of the Division of Particles and Fields of the American Physical Society, *Invited Parallel Talk: 'Run-1 Single-top measurements at CMS'*, (4-8 Aug), University of Michigan, Ann Arbor, MI, US.
 - **SM@LHC: Standard Model at LHC**, *Plenary Talk: 'LHC results on Spin, Anomalous Couplings, and CP structure'*, (21-24 Apr), Galileo Galilei Institute, Florence, IT.
- 2014 **Second CMS Single Top Workshop**, Scientific Program and Talk: 'Lessons learned from Run1 and future prospects', (4-5 Dec), Naples, IT.
 - LHCP 2014: The Second Large Hadron Collider Physics conference, Chair of the TOP Parallel sessions, (2-7 June), New York City Columbia University, US.
- 2013 **CMS Single Top Workshop**, Scientific Program and Closing Talk: 'Next steps and summary', (19-20 Dec), Naples, IT.
 - **TOP2013: 6th International Workshop on Top Quark Physics**, *Plenary Talk: 'Inclusive single top cross section at the LHC'*, (4-19 Sep), Durbach, DE.
- 2012 4th generation and single-top: Workshop on fourth fermion generation and on single-top production, *Invited Talk: 'tW production at CMS'*, (26-28 Mar), Leinsweiler, DE.
 - Rencontres de Moriond QCD and High Energy Interactions, Plenary Talk: 'Single Top Production at $\sqrt{s}=7$ TeV', (10-17 Mar), La Thuile, IT.

- 2010 **II CPAN days: Segundas Jornadas del CPAN**, *Invited Plenary Talk: 'Higgs and SUSY searches in CMS'*, (29-30 Nov), Valencia, ES.
 - BEACH 2010 IX International Conference on Hyperons, Charm and Beauty Hadrons, *Plenary Talk: 'Higgs Search Prospects at the LHC'*, <u>Chair of the session</u>: Heavy Flavor Decays and Properties I, (21-26 Jun), Perugia, IT.
- 2009 **PASCOS 2009: 15th International Symposium on Particles Strings and Cosmology**, *Parallel Talk: 'EW symmetry breaking at the LHC'*, *(6-10 Jul)*, Hamburg, DE.
- 2008 **ICHEP08: 34th International Conference on High Energy Physics**, *Poster: 'Discovery Potential for the SM Higgs Boson in the H \to WW^* \to 2l2\nu channel at the LHC'*, (Jul 29 Aug 5), Philadelphia, Pennsylvania, US.
- 2007 CHEP07: International Conference on Computing in High Energy and Nuclear Physics, Poster (co-autor): 'A software and computing prototype for CMS Muon system alignment', (2-7 Sep), Victoria BC, CA.

Publications

- Author of the ATLAS Collaboration papers from November 2019, author of the CMS Collaboration papers from 2007 to 2019. Full publication list available [here].
- During my two years as top quark Physics Analysis Group coordinator at the CMS experiment [2016-2018]:
 - 53 results were made public, of which 32 were articles submitted to journals.
 - 6 more papers reflecting analyses I followed up were submitted to journals shortly after.
 - About 35% of the total publications of the The top quark group in CMS were submitted during my convenership.
 - I was the 12th convener of the group
 - Complete list of results is available in this [link].
- During my Higgs to WW sub-convenership [2014-2016], 2 papers were submitted to journals: arXiv:1606.01522-JHEP 03 (2017) 032 which was the 500th paper of CMS, and arXiv:1605.02329-JHEP 09 (2016) 051, as well as seven preliminary results.
- During my single top quark sub-convenership [2012-2013], 7 papers where submitted to journals, and 10 preliminary results made public.

Analysis Contact, Primary Author, Editor

- 2019 To catch a long-lived particle: hit selection towards a regional hardware track trigger implementation, arXiv:1907.09846, JINST 14 P11009 (2019).
- 2017 **Recent CMS results in top and Higgs physics**, *arXiv:1707.05054*, Modern Physics Letters A, 2, Vol. 32, No. 29 (2017) 1730026.
- 2015 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 (2015).
- 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 (2014)..
 - Measurement of Higgs boson production and properties in the WW decay channel with leptonic final states, arXiv:1312.1129, JHEP 01(2014)096.
- 2013 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).

Substantial Contribution

- 2016 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 TeV, arXiv:1606.02266, JHEP 1608 (2016) 045.
- 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, JHEP06(2016)177.
 - 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.

- 2013 Snowmass 2013 Top quark working group report, arXiv:1311.2028.
 - Observation of a new boson with mass near 125 GeV in pp collisions at $\sqrt{s}=$ 7 and 8 TeV, arXiv:1303.4571, JHEP 1306 (2013) 081.
- 2012 Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC, arXiv:1207.7235, Phys.Lett. B716 (2012) 30-61.
 - 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.
- 2011 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.
 - 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.

Conference Proceedings

- 2015 Run-1 Single top measurements at CMS, Proceedings DPF 2015, arXiv:1510.05235.
- 2014 **Inclusive single top cross section at the LHC**, *Proceedings TOP 2013*, DOI:10.3204/DESY-PROC-2014-02/16.
- 2012 Single top Production at $\sqrt{s} = 7$ TeV, Proceedings Moriond 2012, arXiv:1205.2786.
- 2010 **Higgs search prospects at the LHC**, *Proceedings BEACH 2010*, Nucl.Phys.Proc.Suppl. 210-211 (2011) 283-288.
- 2008 Discovery Potential for the SM Higgs Boson in the $H \to WW^* \to 2l2\nu$ channel at LHC, *Proceedings ICHEP 2008*, arXiv:0810.1468.
- 2007 A Software and Computing prototype for CMS Muon System alignment, *Proceedings CHEP* 2007, Journal of Physics: Conference Series 119 (2008) 072008.

Selected Public Results

Primary Author, Editor

- 2016 First results on Higgs to WW at $\sqrt{s} = 13$ TeV, HIG-15-003.
- 2014 Constraints on Anomalous HWW Interactions using Higgs boson decays to W+W- in the fully leptonic final state, *HIG-14-012*.
- 2012 Observation of Associated Production of a Single Top Quark and W Boson in pp Collisions at $\sqrt{s}=8$ TeV, TOP-12-040.
- Search for single top tW associated production in the dilepton decay channel in pp collisions at $\sqrt{s}=7$ TeV, TOP-11-022.
- 2010 Performance of muon identification in pp collisions at $\sqrt{s} = 7$ TeV, MUO-10-002.
- 2008 Search Strategy for a Standard Model Higgs Boson Decaying to Two W Bosons in the Fully Leptonic Final State, *HIG-08-006*.
- 2007 Search for the Higgs boson in the WW decay channel with the CMS experiment, HIG-07-001. Substantial Contribution
- 2017 Higgs to WW measurements with 15.2 fb^{-1} of 13 TeV proton-proton collisions, HIG-16-021.
- Combination of cross-section measurements of associated production of a single top quark and a W boson at $\sqrt{s}=8$ TeV with the ATLAS and CMS experiments, TOP-15-019. Search for ttH production in multilepton final states at $\sqrt{s}=13$ TeV, HIG-15-008.
- 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 TeV, HIG-15-002.
- 2014 Search for $H \to b \bar b$ in association with single top quarks as a test of Higgs boson couplings, HIG-14-015
 - Combination of cross-section measurements of associated production of a single top-quark and a W boson at $\sqrt{s}=$ 8 TeV with the ATLAS and CMS experiments, TOP-14-009.

Constraints on anomalous HVV interactions using H to 4I decays, HIG-14-014.

2011 Measurement of the top-quark pair-production cross section in the lepton+jets channel with the use of b-tagging, *TOP-10-003*.

Measurement of the top-quark pair-production cross section in the di-lepton channel at 7 TeV, TOP-10-005.

2010 Search for $H \rightarrow WW \rightarrow 2l$ 2nu, HIG-10-003. Observation of WW final state, EWK-10-009.

Selected Outreach Activities

Very active outreach and science communication profile, an extended (though incomplete) list of my activities can be found [here].

Some highlights include:

- Personal **Twitter** account "*1cRebeca*" used mostly for outreach and science communication. Curated rotating accounts, such as emphlamSciComm (23K+ followers, Sep. 2019) [link].
- Official CERN, ATLAS, 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: 2013-2015.
- **Local Organizer** of the International Masterclasses by the International Particle Physics Outreach Group (IPPOG) at Uppsala University (2020).
- Moderator of the International Masterclasses by the IPPOG (2015-2017).
- o Ask a scientist in the night of the Researchers (FNAC Rive Geneva 2014, FNAC Balexert Geneva 2015).
- o CERN speaker for the International Day of Women and Girls in Science, Geneva (CH) (2017-2018).
- Public lectures, Q&A sessions, meet and greet. Interviews in radio, TV, newspapers, magazines.
- Featuring in CERN official videos: Facebook Live from the LHC tunnel [link], February 2018; April Fools' Day video [link] (2016); or official CERN LHC Season 2 videos [link] (2015) among others.
- o Different activities within the Spanish, Mexican, and Swedish High School Teacher Programmes at CERN.
- Member of the jury for the *I Premio Premio José Ramón Lueje de Investigación y Comunicación*, science communication awards for high school students, Cangas de Onís, Asturias (2015).
- Contributions to the IPPOG website and to different blogs, including a personal blog with CERN pictures, lonelychairsatcern.tumblr.com (20K followers).

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** (2012-2017) shifts, and **Run Field Manager** (2015-2017)

Panel membership:

- 103rd Plenary ECFA meeting at CERN (link) [2018].
- Spanish teacher program at CERN [2017].

Membership of Scientific Societies:

- Mainternational Fellow of the Explorers Club (Swedish Chapter) (2016). **Board Member**.
- Member of the Uppsala Society for Women Scientists.
- Member of ACES: Asociación de Científicos Españoles en Suecia.
- Member of the Swedish Physics Society (Svenska Fysikersamfundet).
- Member of the Royal Spanish Society of Physics (RSEF).

Not scientific, but still noteworthy

- Participant in the performance: 'Marina Abramovic MAI presents: Counting the Rice' (2014) Centre d'Art Contemporain Genève in a site-specific structure designed by Daniel Libeskind and produced by Moroso.
- Member of the 'Jurado Joven', 44 edition of the Gijón Film Festival (2006).
- Co-creator and spokesperson of 'MEAL (MEatball AcceLerator)', 2019 Stupid Hackathon Sweden.