

Current position

Adjunct Research Associate, *University of Nebraska, Lincoln*, US.
Since November 1st, 2012.

Previous positions

2010-2012 **Post-doctoral fellow**, *Vrije Universiteit Brussel (VUB)*, BE.
2006-2010 **PhD Student**, *Instituto de Fisica de Cantabria (IFCA)*, ES.

Education

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 a SM Higgs Boson in the LHC with the CMS experiment using the $H \rightarrow WW^* \rightarrow 2\mu 2\nu$ decay channel' [link]
supervisors J. Cuevas and T. Anoro

Coordination positions

2016-2018 **Top convener**
(From September 1st) Coordinator of the top quark Physics Analysis Group of the CMS experiment. Level 2 management within the CMS collaboration. Physics coordination.

2015-2016 **Higgs to WW convener**
Coordinator of the Higgs to WW physics in the CMS experiment. 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.

Other positions of responsibility

2014-2015 **Contact person**, *Monte Carlo Simulation*, Higgs to WW subgroup.
2011-2012 **Contact person**, *Local reconstruction of the Strip Tracker*.
2011-2012 **Contact person**, *High Level Trigger for the Strip Tracker*.

2015-2016 **Run Field Manager**, *Coordinating the operations of the CMS experiment, link between the shift crews and Run coordination.*

Editor and contact of arXiv:1411.3441 (PRD), and arXiv:1209.3489 (PRL); and of public documents TOP-11-022, and HIG-14-012.

Participation in Thesis Boards

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

2016 **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 **Seminar at 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, *' $H \rightarrow WW$ at CMS'*, (13 August), Fermilab Batavia, IL, US.

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

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

Seminar at the Universite 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.

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

2014 **CERN Collider Cross Talk**, *' $H \rightarrow WW$ from ATLAS and CMS'*, (27 November), CERN, CH.

LHC seminar, *'Recent top physics results from CMS'*, (25 February), CERN, CH.

2013 **Seminar at Uppsala University**, *'Overview of single top results at the LHC'*, (10 October), Uppsala, SE.

Conferences

- 2016 **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, 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 $\sqrt{s} = 7\text{TeV}$ '*, (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'*, *Chair of the session: 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 $H \rightarrow WW^* \rightarrow 2l2\nu$ 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-author): 'A software and computing prototype for CMS Muon system alignment'*, (2-7 Sep), Victoria BC, CA.

Membership of Analysis Review Committees

- 2016 **Measurement of the top quark mass in the dileptonic ttbar decay channel using the Mbl, MT2, and MAOS Mblv observables**, *TOP-15-008, Chair*.

- Measurement of the W boson helicity fractions in the decays of top quark pairs to lepton+jets final states produced in pp collisions at $\sqrt{s} = 8$ TeV, *arXiv:1605.09047*, Submitted to Phys. Lett. B.
- Measurement of the top quark mass from single-top production events, *TOP-15-001*, [Chair](#).
- 2015 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.
- 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 $\sqrt{s} = 8$ TeV using a template method, *arXiv:1508.03862*, Phys. Rev. D 93, 034014 (2016).
- 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 3000fb^{-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 by: PA = Primary Author; ED = Editor; C = Contributor; R = Review; P = Proceedings

Primary Author, Editor

- 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, [PA-ED].
- 2014 **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].
- 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 **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].

Contribution

- 2015 **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, [C-R].
- 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 **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 **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].
- 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].

Review

- 2016 **Measurement of the transverse momentum spectrum of the Higgs boson produced in pp collisions at $\sqrt{s} = 8$ TeV using H to WW decays**, *arXiv:1606.01522*, Submitted to J. High Energy Phys, **500th paper of CMS** [R - Higgs to WW].
- Search for Higgs boson off-shell production in proton-proton collisions at 7 and 8 TeV and derivation of constraints on its total decay width**, *arXiv:1605.02329*, Submitted to J. High Energy Phys, [R - Higgs to WW].
- 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 **Search for anomalous single top quark production in association with a photon in pp collisions at $\sqrt{s} = 8$ TeV**, *arXiv:1511.03951*, JHEP 04 (2016) 035, [R - Single Top].
- Measurement of top quark polarisation in t-channel single top quark production**, *arXiv:1511.02138*, JHEP 04 (2016) 073, [R - Single Top].
- 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 **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].

Conference Proceedings

- 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].
- 2007 **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 by: PA = Primary Author; ED = Editor; C = Contributor; R = Review

Primary Author, Editor

- 2016 **First results on Higgs to WW at $\sqrt{s} = 13$ TeV**, *HIG-15-003*, [ED- HWW].

- 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].**

Contribution

- 2016 **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-15-019*, [C].**
Search for ttH production in multilepton final states at $\sqrt{s} = 13\text{ TeV}$, *HIG-15-008*, [C,R - Higgs to WW].
- 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*, [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].**
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].
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].**
Measurement of the top-quark pair-production cross section in the di-lepton channel at 7 TeV , *TOP-10-005*, [C].
- 2010 **Search for $H \rightarrow WW \rightarrow 2l\ 2\nu$, *HIG-10-003*, [C].**
Observation of WW final state, *EWK-10-009*, [C].

Review

- 2016 **Search for Higgs boson pair production in the $b\bar{b}l\nu l\nu$ final state at $\sqrt{s} = 13\text{ TeV}$, *HIG-16-024*, [R - Higgs to WW].**
Search for high mass Higgs to WW with fully leptonic decays using 2015 data, *HIG-16-023*, [R - Higgs to WW].
Search for associated production of Higgs bosons and top quarks in multi-lepton final states at $\sqrt{s} = 13\text{ TeV}$, *HIG-16-022*, [R - Higgs to WW].

Search for associated production of a Z boson with a single top quark and for tZ flavour-changing interactions in pp collisions at $\sqrt{s} = 8 \text{ TeV}$, *TOP-12-039*, [R - Single top].

Search for resonant Higgs boson pair production in the $b\bar{b}l\nu l\nu$ final state at $\sqrt{s} = 13 \text{ TeV}$, *HIG-16-011*, [R - Higgs to WW].

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].**

Search for anomalous Wtb couplings and top FCNC in t-channel single-top-quark events, *TOP-14-007*, [R - Single top].

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].**

Measurement of top quark polarization in t-channel single-top production, *CMS-PAS-TOP-13-001*, [R - Single top].

Combination of single top-quark cross-sections measurements in the t-channel at $\sqrt{s} = 8 \text{ TeV}$ 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

Without specific order:

- **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 Balexert Geneva 2015)
- *CMSVoices* Twitter account of February 2016
- Role in the April Fools' Day video from CERN [link] (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

Supervisor of summer students at CERN in 2012 (Isis Marina Van Parijs) and co-supervisor in 2013 (Ivan Shvetsov), both projects related to single top physics.

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-today)

Member of the Royal Spanish Society of Physics (RSEF).

🇪🇺 International Fellow of the Explorers Club (Western Europe Chapter).

August 16, 2016