

Current position

Researcher at Department of Physics and Astronomy, High Energy Physics, Uppsala University, Funded by individual Starting Grant from the Swedish Research Council.

Since August, 2018.

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

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

Grants and awards

2018 **Individual Vetenskapsrådet Starting Grant, Swedish Research Council, Uppsala University, SE.**

2017 **Individual Future Fellowship Grant, Australian Research Council, University of Adelaide, AU.**

Coordination positions

- **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]

Other positions of responsibility

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

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

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, *' $H \rightarrow WW$ 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.

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.

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

Conferences

2018 **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, US.

- 2017 **TOP2017: 10th 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 **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 $\sqrt{s} = 7\text{TeV}$ '*, (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 $\sqrt{s} = 8\text{ TeV}$** , *arXiv:1605.09047*, *Phys. Lett. B* 762 (2016) 512.
- 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*, JHEP06(2016)177.
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

- 2017 **Recent CMS results in top and Higgs physics**, *arXiv:1707.05054*, Modern Physics Letters A, 2, Vol. 32, No. 29 (2017) 1730026, [PA-ED].
- 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), [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 (2014), [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

- 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, [C].
- 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].
- 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, [C].
- 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, [C].
- 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*, JHEP 03 (2017) 032, **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*, JHEP 09 (2016) 051, [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*, JHEP 09 (2016) 027, [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].

[Publications from the CMS top quark group](#)

2018 **Measurement of jet substructure observables in $t\bar{t}$ events from proton-proton collisions at $\sqrt{s} = 13$ TeV**, *Submitted to PRD*, arXiv:1808.073403.

Evidence for the associated production of a single top quark and a photon in proton-proton collisions at $\sqrt{s} = 13$ TeV, *Submitted to PRL*, arXiv:1808.02913.

Study of the underlying event in top quark pair production in pp collisions at 13 TeV, *Submitted to EPJC*, arXiv:1807.02810.

Measurement of the production cross section for single top quarks in association with W bosons in proton-proton collisions at $\sqrt{s} = 13$ TeV, *Submitted to JHEP*, arXiv:1805.07399.

Measurement of the top quark mass with lepton+jets final states using pp collisions at $\sqrt{s} = 13$ TeV, *Submitted to EPJC*, arXiv:1805.01428.

Measurement of differential cross sections for the production of top quark pairs and of additional jets in lepton+jets events from pp collisions at $\sqrt{s} = 13$ TeV, *Phys. Rev. D* 97, 112003 (2018), arXiv:1803.08856.

Measurements of differential cross sections of top quark pair production as a function of kinematic event variables in proton-proton collisions at $\sqrt{s} = 13$ TeV, *JHEP* 06 (2018) 002, arXiv:1803.03991.

2017 **Measurement of the associated production of a single top quark and a Z boson in pp collisions at $\sqrt{s} = 13$ TeV**, *Phys. Lett. B* 779 (2018) 358-384, arXiv:1712.02825.

Search for the flavor-changing neutral current interactions of the top quark and the Higgs boson which decays into a pair of b quarks at $\sqrt{s} = 13$ TeV, *JHEP* 06 (2018) 102, arXiv:1712.02399.

Measurement of the inclusive $t\bar{t}$ cross section in pp collisions at $\sqrt{s} = 5.02$ TeV using final states with at least one charged lepton, *JHEP* 03 (2018) 115, arXiv:1711.03143.

Measurement of the cross section for top quark pair production in association with a W or Z boson in proton-proton collisions at $\sqrt{s} = 13$ TeV, *JHEP* 08 (2018) 011, arXiv:1711.02547.

Search for standard model production of four top quarks with same-sign and multilepton final states in proton-proton collisions at $\sqrt{s} = 13$ TeV, *Eur. Phys. J. C* (2018) 78: 140, arXiv:1710.10614.

Combination of inclusive and differential $t\bar{t}$ charge asymmetry measurements using ATLAS and CMS data at $\sqrt{s} = 7$ and 8 TeV, *JHEP* 04 (2018) 033, arXiv:1709.05327.

Measurement of normalized differential $t\bar{t}$ cross sections in the dilepton channel from pp collisions at $\sqrt{s} = 13$ TeV, *JHEP* 04 (2018) 060, arXiv:1708.07638.

Measurement of the semileptonic $t\bar{t} + \gamma$ production cross section in pp collisions at $\sqrt{s} = 8$ TeV, *JHEP* 10 (2017) 006, arXiv:1706.08128.

Measurements of $t\bar{t}$ cross sections in association with b jets and inclusive jets and their ratio using dilepton final states in pp collisions at $\sqrt{s} = 13$ TeV, *Phys. Lett. B* 776 (2017) 355, arXiv:1705.10141.

Measurement of the top quark mass in the dileptonic $t\bar{t}$ decay channel using the mass observables M_{bl} , M_{T2} , and M_{lb} in pp collisions at $\sqrt{s} = 8$ TeV, *Phys. Rev. D* 96 (2017) 032002, arXiv:1704.06142.

Measurement of the jet mass in highly boosted $t\bar{t}$ events from pp collisions at $\sqrt{s} = 8$ TeV, *Eur. Phys. J. C* 77 (2017) 467, arXiv:1703.06330.

Measurement of the top quark mass using single top quark events in proton-proton collisions at $\sqrt{s} = 8$ TeV, *EPJC* 77 (2017) 354, arXiv:1703.02530.

Measurement of double-differential cross sections for top quark pair production in pp collisions at $\sqrt{s} = 8$ TeV and impact on parton distribution functions, *EPJC* 77 (2017) 459, arXiv:1703.01630.

Search for standard model production of four top quarks in proton-proton collisions at $\sqrt{s} = 13$ TeV, *Phys. Lett. B* 772 (2017) 336, arXiv:1702.06164.

- Search for associated production of a Z boson with a single top quark and for tZ flavour-changing interactions in pp collisions at $\sqrt{s} = 8$ TeV, *JHEP* 07 (2017) 003, arXiv:1702.01404.
- Measurement of the $t\bar{t}$ production cross section using events with one lepton and at least one jet in pp collisions at $\sqrt{s}=13$ TeV, *JHEP* 09 (2017) 051, arXiv:1701.06228.
- 2016 Search for CP violation in $t\bar{t}$ production and decay in proton-proton collisions at $\sqrt{s} = 8$ TeV, *JHEP* 03 (2017) 101, arXiv:1611.08931.
- Measurement of the $t\bar{t}$ production cross section using events in the $e\mu$ final state in pp collisions at $\sqrt{s} = 13$ TeV, *EPJC* 77 (2017) 172, arXiv:1611.04040.
- Measurement of the mass difference between top quark and antiquark in pp collisions at $\sqrt{s} = 8$ TeV, *Phys. Lett. B* 770 (2017) 50, arXiv:1610.09551.
- Search for top quark decays via Higgs-boson-mediated flavor-changing neutral currents in pp collisions at $\sqrt{s} = 8$ TeV, *JHEP* 02 (2017) 079, arXiv:1610.04857.
- Measurement of differential cross sections for top quark pair production using the lepton+jets final state in proton-proton collisions at 13 TeV, *Phys. Rev. D* 95, 092001 (2017), arXiv:1610.04191.
- Cross section measurement of t-channel single top quark production in pp collisions at $\sqrt{s} = 13$ TeV, *Phys. Lett. B* 772 (2017) 752, arXiv:1610.00678.
- [Other public documents from top](#)
- 2017 Object definitions for top quark analyses at the particle level, *CMS-NOTE-2017-004*, CERN-CMS-NOTE-2017-004.

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 $\sqrt{s} = 8$ TeV, *TOP-12-040*, [PA].
- 2011 Search for single top tW associated production in the dilepton decay channel in pp collisions at $\sqrt{s} = 7$ TeV, *TOP-11-022*, [PA- ED].
- 2010 Performance of muon identification in pp collisions at $\sqrt{s} = 7$ 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

- 2017 Higgs to WW measurements with 15.2 fb^{-1} of 13 TeV proton-proton collisions, *HIG-16-021*, [C].
- 2016 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*, [C].
- Search for ttH production in multilepton final states at $\sqrt{s} = 13$ 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 $\sqrt{s} = 8$ 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](#)

- 2018 **Measurement of the single top quark and antiquark production cross sections in the t channel and their ratio in pp collisions at $\sqrt{s} = 13$ TeV, TOP-17-011, [R - top].**

Measurement of the top quark mass in the all-jets final state at $\sqrt{s} = 13$ TeV, TOP-17-008, [R - top].

Measurements of differential cross sections for $t\bar{t}$ production in proton-proton collisions at $\sqrt{s} = 13$ TeV using events containing two leptons, TOP-17-014, [R - top].

Search for top+photon production in pp collisions at 13 TeV in the muon+jets channel, TOP-17-016, [R - top].

Study of the underlying event in top quark pair production at $\sqrt{s} = 13$ TeV, TOP-17-015, [R - top].

Measurement of jet substructure observables in $t\bar{t}$ events from pp collisions at $\sqrt{s} = 13$ TeV, TOP-17-013, [R - top].

- 2017 **Search for flavour changing neutral currents in top quark production and decays with three-lepton final state using the data collected at $\sqrt{s} = 13$ TeV, TOP-17-017, [R - top].**

Search for the flavor-changing interactions of the top quark with the Higgs boson in $H \rightarrow b\bar{b}$ channel at $\sqrt{s} = 13$ TeV, TOP-17-003, [R - top].

Evidence for the standard model production of a Z boson with a single top quark in pp collisions at $\sqrt{s} = 13$ TeV, TOP-16-020, [R - top].

Measurement of the production cross section for single top quarks in association with W bosons in pp collisions at $\sqrt{s} = 13$ TeV, TOP-17-018, [R - top].

Measurement of the top quark mass with lepton+jets final states in pp collisions at $\sqrt{s} = 13$ TeV, TOP-17-007, [R - top].

Measurement of differential cross sections for top quark pair production and associated jets using the lepton+jets final state in proton-proton collisions at 13 TeV, TOP-17-002, [R - top].

Search for the standard model production of four top quarks with same-sign and multilepton final states in proton-proton collisions at $\sqrt{s} = 13$ TeV, TOP-17-009, [R - top].

Measurement of the differential $t\bar{t}$ cross section with high- p_T top-quark jets in the all-hadronic channel at $\sqrt{s} = 8$ TeV, TOP-16-018, [R - top].

Measurement of the differential cross sections of top quark pair production as a function of kinematic event variables in pp collisions at $\sqrt{s} = 13$ TeV, TOP-16-014, [R - top].

Measurement of top quark pair-production in association with a W or Z boson in pp collisions at 13 TeV, TOP-17-005, [R - top].

Measurement of the inclusive $t\bar{t}$ cross section at $\sqrt{s} = 5.02$ TeV, TOP-16-023, [R - top].

Measurement of the top quark mass with muon+jets final states in pp collisions at $\sqrt{s} = 13$ TeV, TOP-16-022, [R - top].

- 2016 **Investigations of the impact of the parton shower tuning in Pythia 8 in the modelling of $t\bar{t}$ at $\sqrt{s} = 8$ and 13 TeV, TOP-16-021, [R - top].**

- Combinations of the CMS alternative technique measurements of the top quark mass, *TOP-15-012*, [R - top].**
- Bounding the top quark width using final states with two charged leptons and two jets at $\sqrt{s} = 13$ TeV , *TOP-16-019*, [R - top].**
- Measurement of the $t\bar{t} + \gamma$ production cross-section in pp collisions at $\sqrt{s} = 8$ TeV, *TOP-14-008*, [R - top].**
- Measurement of the jet mass distribution in boosted $t\bar{t}$ production at $\sqrt{s} = 8$ TeV, *TOP-15-015*, [R - top].**
- Search for Higgs boson pair production in the $b\bar{b}l\nu l\nu$ final state at $\sqrt{s} = 13$ 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 multilepton final states at $\sqrt{s} = 13$ 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 $\sqrt{s} = 8$ 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 $\sqrt{s} = 13$ TeV, *HIG-16-011*, [R - Higgs to WW].**
- 2015 **Measurement of the transverse momentum spectrum of the Higgs boson produced in pp collisions at $\sqrt{s} = 8$ 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 $\sqrt{s} = 8$ 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 $\sqrt{s} = 8$ 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 $\sqrt{s} = 8$ 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 $\sqrt{s} = 7$ 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

- CERN Facebook live from the LHC tunnel, February 28 2018 [link].
- **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) (2015-2017).
- CMS Guide, school@CMS (2016-2015).
- *Ask a scientist* in the night of the Researchers (FNAC Rive Geneva 2014, FNAC Balexert Geneva 2015).


- Invited speaker at the *International School of Geneva* International Day of Women and Girls in Science, February 9, Geneva (CH) (2018).
- Invited speaker at the *Agrupación Astronómica de Madrid (AAM)* Seminar: 'Buscando nueva física en el LHC: qué hay después del Higgs?', March 14 (2017), Madrid, Spain.
- Invited speaker at the *Collège du Léman* International Day of Women and Girls in Science, February 10, Geneva (CH) (2017).
- Invited speaker at the 'XXV Jornadas de Astronomía' of the science society *Aranzadi*. Seminar: 'Puede el LHC producir materia oscura? Partículas elementales y el límite entre micro y macro cosmos'. 4 October 2016, San Sebastián, Spain [link].
- *Particle Fever* movie meet and greet in the University of Columbia (NY) (2014).
- Guest speaker at ENP Ferney for gender awareness training (2012).
- CERN Facebook Live from the LHC tunnel [link], February 2018.
- Video interview for the 'Fundación AQUAE' [link], October 2017.
- Appearance in 'Informativos Telecinco' [link], January 1st, 2017.
- Appearance in the Spanish TV program about science 'El cazador de cerebros', 29 October 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).
- Spanish subtitles for the CMS introduction video, [link].
- Different activities within the Spanish Teacher Programme at CERN (also Swedish).
- CMS guide for the Global Science Opera 'Ghost Particles' (2016).
- 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 International Particle Physics Outreach Group (IPPOG) website.
- *CMSVoices* Twitter account of February 2016.
- Contributions to the CMS blog: *the Cylindrical Onion*.
- Personal blog with CERN pictures, *lonelychairsatcern.tumblr.com* (20K followers).

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

- Member of the steering panel of Art@CMS (2017-2018).
- Member of the Royal Spanish Society of Physics (RSEF).
-  International Fellow of the Explorers Club (Western Europe Chapter).
- Member of the 'Jurado Joven', 44 edition of the Gijón Film Festival (2006).

September 6, 2018