

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

Current position

2018- **Researcher at the Department of Physics and Astronomy, High Energy Physics, Uppsala University**, 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

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 $H \rightarrow WW^* \rightarrow 2\mu 2\nu$ 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

- *Seminar organizer.* Weekly seminars in Nuclear and Particle physics at the Physics and Astronomy Department, Uppsala University [2019-]
- *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]
- *Contact person*. High Level Trigger for the Strip Tracker, CMS experiment. [2011-2012]
- Editor and analysis contact of arXiv:1411.3441 (PRD), arXiv:1209.3489 (PRL), TOP-11-022, and HIG-14-012.

Reviewing activities

- **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, Asia, and Oceania. [2016-2019]
- **Referee**. European Physical Journal C. [2018]

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.

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 **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 **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**, *' $H \rightarrow WW$ 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 **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, US.
- 2017 **Top! Hammertime (a CMS top quark workshop)**, *Chair of the workshop*, (14-15 Nov) CERN, CH.
- 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 **top at 100fb^{-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 $\sqrt{s} = 7\text{TeV}$ '*, (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.

Publications

- Signing author of the CMS Collaboration papers from 2007 to 2019. Full publication list available [here].
 - Currently qualifying for authorship in ATLAS.
- 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 were 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*, Submitted to JINST.
- 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).
- 2014 **Observation of the associated production of a single top quark and a W boson in pp collisions at $\sqrt{s} = 8\text{TeV}$** , *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.
- 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*, 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 $\sqrt{s} = 7\text{ TeV}$** , *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 $\sqrt{s} = 7\text{ TeV}$** , *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*, [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 $\sqrt{s} = 7\text{ TeV}$** , *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

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*.
- 2011 **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*.
- 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*.
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 $H \rightarrow b\bar{b}$ 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 4l 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 $H \rightarrow WW \rightarrow 2l 2\nu$** , *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:

- **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.
- **Moderator** of the International Masterclasses by the International Particle Physics Outreach Group (IPPOG) (2015-2017).
- *Ask a scientist* in the night of the Researchers (FNAC Rive Geneva 2014, FNAC Ballexert Geneva 2015).
- Public lectures, Q&A sessions, meet and greet.
- CERN speaker for the International Day of Women and Girls in Science, Geneva (CH) (2017-2018).
- 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.
- 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 International Particle Physics Outreach Group (IPPOG) website and to different blogs, including a 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)

Panel membership:

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

Membership of Scientific Societies:

-  International Fellow of the Explorers Club (Swedish Chapter) (2016).
- 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).
- Member of the steering panel of Art@CMS (2017-2018).

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).

September 15, 2019