

# Harold Yepes Ramírez

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## PROFILE

**Nuclear Technology.** Former collaborator of large scientific and technological infrastructures worldwide as ANTARES/KM3NeT (Western Europe), MINERvA/MINOS (North America) and NEXT/RD51 (Western Europe). External advisor of important developing countries government facilities as that of the IAN-R1 Research Nuclear Reactor and the Secretary for Control and Nuclear Applications SCAN (South America).

**Project Management.** Technology transfer, proposals and implementation of institutional framework agreements. Technical and scientific cooperation. Design, submission and implementation of budgets. Projects coordination, participation in specialized boards (publications, conference, peer-reviewed, instrumental of challenging) and international memberships. Consultancy. Events organization and disclosure. National and international scope. Manager and Principal Investigator in Latin America of the KM3NeT collaboration. National representative of LASF4RI – Latin America Strategy Forum for large-scale Research Infrastructures.

**High level teaching, training and academy.**

Specialized courses on Subatomic Physics and special topics on Experimental Nuclear and Particle Physics. Advanced Statistical and Mathematical Methods for Data Analysis. High performance computing systems, data analysis frameworks and programming languages. Classical physics: mechanics, waves and electromagnetism. Director (IC) of postgraduate programs, jury and director of PhD and bachelor thesis respectively.

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## EDUCATION

**P-PhD in Experimental Nuclear and Particle Physics**

United States of America Department of Energy “DOE” – Brazilian Centre for Research in Physics “CBPF” (2015)

**PhD in Experimental Nuclear and Particle Physics**

University of Valencia “UVEG” – Spanish Research Council “CSIC” (2014)

**Master in Advanced Physics**

University of Valencia “UVEG” – Spanish Research Council “CSIC” (2009)

**Master in Nuclear Technology**

Autonomous University of Madrid “UAM” – Spanish Research Center for Energy, Environment and Technology “CIEMAT” (2007)

## **Physics Engineering (Homologated degree to EEES, B.S. in Physics)**

National University of Colombia "UNAL" (2006) / Spanish Ministry of Education "MECD" (2010)

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### **SKILLS (HARD/SOFT)**

**Linux - Windows • Oracle RDBMS - MySQL • ROOT – ART • C++ - Perl – Shell –  
Bash – Python – Latex – MatLab**

**Nuclear • Physics – Engineering – Calibration - Data Analysis – Modelling**

**Technology • Optical Systems – Acquisition and Communication Systems –  
Instrumentation – GRID, Batches and Computing  
Clusters**

**Leadership – Entrepreneurship – Spinoff – Startup – Outsourcing  
Empowering - Neurocoding – High performance team  
building – Work under pressure**

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### **EXPERIENCE**

#### **Yachay Tech (Ecuador) (Current)**

Booster of the Nuclear and Particle Physics program and strategy in the campus. Technical and scientific cooperation: a) MERNNR (Ministry of Energy and Non-Renewable Resources) – SCAN (Secretary for Control and Nuclear Applications) – IAEA (International Atomic Energy Agency), Ecuador. b) KM3NeT: the largest undersea research infrastructure at the Northern Hemisphere for Subatomic Physics and Earth Sciences studies.

Lecturer on Subatomic Physics. Director of bachelor thesis.

PRESIDENT of the instrumental of challenging board for tenured positions.

#### **L&Y Consulting (Colombia) (Current)**

Chief Operative Officer (COO) and Consultant on Nuclear Affairs.

#### **Colombian Research Council "COLCIENCIAS" (Colombia – Argentina) (Current)**

Peer-Reviewed (Junior): particle physics and fields, nuclear physics, statistic and probabilities, other engineering and technologies, matter structure physics, astronomy.

Evaluation for internal and external funding for the study and development of photo-refractive Silenitas-like crystals and study of holographic records.

#### **Ministry of Mines and Energy "MINMINAS" (Colombia) (Current)**

Panel of experts for the design and evaluation of tests within the authorization and licensing procedure for supervisors and operators of the IAN-R1 Research Nuclear Reactor. Guidelines regarding IAEA mandates.

#### **Antonio Nariño University "UAN" (Colombia – Spain) (2017)**

Characterization of the NEXT experiment (TPC) tracking plane, looking to extract the topology of rare nuclear events such as Neutrinoless Double Beta Decay.

MPGD's (RD51) for novel detection technologies: mounting, calibration, configuration options and possible applications.

Spinoff from NEXT technology to prototypes for VLC systems with SiPM as receptor. Contribution on scientific inputs for viability of the system.

Director (mandated) of Master in Physics Engineering, coordination of the professional line on detectors. Coordinator of the annual seminar of detectors, instrumentation and technological solutions. Member of the Science, Technology and Innovation Committee of the Research Center in Basic and Applied Sciences.

Lectures on experimental physics. Jury of Doctoral Thesis.

#### **United States of America Department of Energy (USA) (2015)**

MINERvA experiment at FERMILAB DOE Lab (USA), a fine-grained scintillation detector providing world's best, high-precision measurements of neutrino cross-section in several nuclear targets.

Contribution either on the adaptation of the MINOS detector calibration scheme into MINERvA and on the mapping of the MINERvA EM spectrometer for muon-to-neutrino momentum reconstruction.

Processing (series and parallel), storage (~ 500 PB) and transfer (8-10 GB / s) of high data flows through high-performance GRID-type computer infrastructures, pioneer system of BIG DATA.

Publications and conferences committee member of MINERvA project.

#### **Spanish Research Council "CSIC" (Spain – France) (2014)**

The first fully operational undersea Neutrino Telescope at Earth's Northern Hemisphere, ANTARES, a Cherenkov detector at the Mediterranean Sea.

Extension of the "Time Calibration System" capabilities towards an improved performance system also able to carry out Optical Calibration. Its implementation in the detector lead to characterize the detection media and then cross-check the results by an experimental method based on reconstructed muon and neutrino tracks crossing/interacting the/with detector. Modelling of the observatory performance in terms of angular resolution and effective area.

#### **University of the Andes (Colombia) (2006)**

Professor. Lectures on physics: mechanics and electromagnetic waves. Lab sessions on experimental physics: electromagnetic waves.

#### **National University of Colombia (Colombia) (2006)**

Instructor. Lectures on experimental physics: mechanics and electromagnetic waves.

#### **Educational Support Advisors "ASAED" (Colombia) (2005)**

Advisor for High School students.

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### **HONORS**

#### **Top-200 best engineers in Energy and Engineering in Europe 2012**

Careers International, Brussels, Belgium

#### **Tutor "Honoris Causa" Colombian Association for the Advancement of Science**

ACAC, Bogotá D.C., Colombia

**Postgraduate fellowships: Master, PhD and PostPhD**

CIEMAT-UVEG-CSIC-CNPq, Madrid-Valencia-Valencia-Rio, Spain-Brazil

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**LANGUAGES**

**English.** Spoken (high), Read (high), Written (high)

**Catalan.** Spoken (low), Read (medium), Written (low)

**Spanish.** Spoken (native), Read (native), Written(native)

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**OTHER DATA**

**Scientific and Technical Publications (APPENDIX A1)**

Technical Reports (4), Methods and Instrumentation (15), Nuclear Technology (5), Space Sciences (19), Earth Sciences (4), Optics and Photonics (3), Others (4).

**Training (APPENDIX A2)**

International seminars, congresses and specialized workshops: as speaker: 19, as assistant: 23.

**Memberships**

Spanish Society of Radiological Protection (active), Spanish Nuclear Society (active), Nuclear Youth Spain (active).

**Mentoring of graduate and postgraduates - Jury of Thesis (APPENDIX A3)**

Graduate thesis: 3

PhD dissertation jury: 2

**Stays at Research and Development Centers, Companies**

National Institute for Subatomic Physics (NIKHEF), Netherlands, May 2019

Canfranc Underground Laboratory (LSC), Spain, May 2016

Institute for Corpuscular Physics (IFIC), Spain, June, August 2015



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**Dr. Harold Yepes-Ramírez**  
Passport Number: AQ919988

## APPENDIX A1

### Scientific and Technical Publications

#### Scientific Publications

1. J. Renner et al. Background rejection in NEXT using deep neural networks. JINST 12 (2017) no.01, T01004.
2. H. Yepes-Ramirez et al. Development of a high performance characterization setup for SiPMs and MPGDs towards their integration in mid-large scale systems. PoS (ICHEP2016) 1057.
3. L.F. Castañeda et al. High-speed visible light communication system based on SiPM. PoS (ICHEP2016) 842.
4. J.F. Castaño et al. Lab-facility of HEP detectors and related technology for training, development, fabrication, applications and innovation. PoS (ICHEP16) 1045.
5. J. Martín-Albo et al. Sensitivity of NEXT-100 to neutrinoless double beta decay. JHEP 1605 (2016) 159.
6. P. Ferrario et al. First proof of topological signature in the high pressure xenon gas TPC with electroluminescence amplification for the NEXT experiment. JHEP 1601 (2016) 104.
7. T. Le et al. Single neutral pion production by charged-current  $\bar{\nu}_{\mu}$  interactions on hydrocarbon at  $\langle E_{\nu} \rangle \geq 3.6$  GeV. Physics Letters B 749 (2015) 130-136.
8. S. Adrián-Martínez et al. ANTARES constrains a blazar origin of two IceCube PeV neutrino events. Astrophysics and Astronomy 576, L8, (2015).
9. S. Adrián-Martínez et al. Constraining the neutrino emission of gravitationally lensed Flat Spectrum Radio Quasars with ANTARES data. JCAP11 (2014) 017.
10. S. Adrián-Martínez et al. A search for time dependent neutrino emission from microquasars with the ANTARES telescope. Journal of High Energy Astrophysics 3–4 (2014) 9-17.
11. S. Adrián-Martínez et al. Searches for clustering in the time integrated skymap of the ANTARES neutrino telescope. JCAP05 (2014) 001.
12. S. Adrián-Martínez et al. Searches for Point-like and Extended Neutrino Sources Close to the Galactic Center Using the ANTARES Neutrino Telescope. The Astrophysical Journal Letters, 786: L5, 2014.
13. Hans van Haren and the ANTARES Collaboration. High-frequency internal wave motions at the ANTARES site in the deep Western Mediterranean. Ocean Dynamics 64 (2014) 507–517.
14. S. Adrián-Martínez et al. A search for neutrino emission from the Fermi Bubbles with the ANTARES telescope. The European Physical Journal C, Eur. Phys. J. C (2014) 74:2701.
15. S. Adrián-Martínez et al. First Results on Dark Matter Annihilation in the Sun using the ANTARES Neutrino Telescope. Journal of Cosmology and Astroparticle Physics, JCAP11 (2013) 032.
16. S. Adrián-Martínez et al. Measurement of the atmospheric  $\nu_{\mu}$  energy spectrum from 100 GeV to 200 TeV with the ANTARES telescope. Eur. Phys. J. C (2013) 73:2606.
17. S. Adrián-Martínez et al. Search for muon neutrinos from gamma-ray bursts with the ANTARES neutrino telescope using 2008 to 2011 data. A&A 559, A9 (2013).
18. S. Adrián-Martínez et al. Search for a Correlation between ANTARES Neutrinos and Pierre Auger Observatory UHECRs Arrival Directions. ApJ 774 (2013) 19.
19. Christian Tamburini et al. Deep-sea bioluminescence blooms after Dense Water Formation at the Ocean Surface. PLOS ONE 8 (2013) e67523.
20. S. Adrian-Martinez et al., Expansion cone for the 3-inch PMTs of the KM3NeT optical modules. Journal of Instrumentation 2013\_JINST\_8\_T03006.
21. S. Adrian-Martinez et al., Detection potential of the KM3NeT detector for high-energy neutrinos from the Fermi Bubbles. Astropart. Phys. 42, 2013, 7-14.

22. S. Adrian-Martinez et al. A first search for coincident Gravitational Waves and High Energy Neutrinos using Ligo, Virgo and Antares data from 2007. *Journal of Cosmology and Astroparticle Physics*, JCAP 06 (2013) 008.
23. S. Adrian-Martinez et al. First search for neutrinos in correlation with gamma-ray bursts with the ANTARES neutrino telescope. *Journal of Cosmology and Astroparticle Physics*, JCAP03 (2013) 006.
24. S. Adrian-Martinez et al., Search for cosmic neutrino point sources with four-year data of the ANTARES telescope. *Astrophysics J.*, 760:53.
25. S. Adrian-Martinez et al., Measurement of atmospheric neutrino oscillations with the ANTARES neutrino telescope. *Phys. Lett. B*, 714 (2012) 224-230.
26. S. Adrian-Martinez et al. The positioning system of the ANTARES neutrino telescope. *Journal of Instrumentation*, JINST 7 T08002, 2012.
27. H. Yepes-Ramirez. Characterization of the optical properties of the site of the ANTARES neutrino telescope. *Nucl. Instr. and Meth. A* 2013. *Nucl. Instrum. Meth. A* 725 203-206. 2013.
28. S. Adrian-Martinez et al. Search for neutrino emission from gamma-ray flaring blazars with the ANTARES telescope. *Astropart. Phys.* 36, 2012, 204-210.
29. S. Adrian-Martinez et al. Measurement of the group velocity of light in sea water at the ANTARES site. *Astropart. Phys.* 35, 552-557. 2012.
30. S. Adrian-Martinez et al. Search for relativistic magnetic monopoles with the ANTARES neutrino telescope. *Astropart. Phys.* 35 634-640. 2012.
31. J. A. Aguilar et al. A method for detection of muon induced electromagnetic showers with the ANTARES detector. *Nucl. Instrum. Meth. A* 675 56-62. 2012.
32. H. Yepes-Ramirez. The ANTARES neutrino detector instrumentation. *Journal of Instrumentation*, 2012-JINST-7-C01022. 2012.
33. S. Adrian-Martinez et al. Contributions to the 32nd International Cosmic Ray Conference (ICRC 2011), Beijing, China. ArXiv:1112.0478v1 [astro-ph. HE] 2011.
34. S. Adrian-Martinez et al. First search for point sources of high energy cosmic neutrinos with the ANTARES neutrino telescope. *Astrophys. J. Lett.* 743 L14-L19. 2011.
35. H. van Haren et al. Acoustic and optical variations during rapid downward motion episodes in the deep north-western Mediterranean Sea. *Deep Sea Research I.* 58 875-884. 2011.
36. M. Ageron et al. The ANTARES telescope neutrino alert system. *Astropart. Phys.* 35 530-536. 2012.
37. M. Ageron et al. ANTARES: The first undersea neutrino telescope. *Nucl. Instr. and Meth. A* 656-1 11-38. 2011.
38. H. Yepes-Ramirez. The ANTARES neutrino telescope: current status and first results. *Nuclear Physics B.* 215 59-62. 2011.
39. J.A. Aguilar et al. A fast algorithm for muon track reconstruction and its application to the ANTARES neutrino telescope. *Astropart. Phys.* 34 652-662. 2011.
40. J.A. Aguilar et al. Time calibration of the ANTARES neutrino telescope. *Astropart. Phys.* 34 539-549. 2011.
41. J.A. Aguilar et al. Search for a diffuse flux of high-energy  $\nu$  with the ANTARES neutrino telescope. *Physics Letters B.* 696 16-22. 2011.
42. H. Yepes-Ramirez. Water absorption length measurement with the ANTARES Optical Beacon system. *Nucl. Instr. And Meth. A* 626-627 S118-S119. 2011.
43. J.A. Aguilar et al. AMADEUS - The acoustic neutrino detection test system of the deep-sea ANTARES neutrino telescope. *Nucl. Instr. And Meth. A* 626-627 128-143. 2011.
44. J.A. Aguilar et al. Zenith distribution and flux of atmospheric muons measured with the 5-line ANTARES detector. *Astropart. Phys.* 34 179-184. 2010.

45. J.A. Aguilar et al. Performance of the front-end electronics of the ANTARES neutrino telescope. Nucl. Instr. and Meth. A 622 59-73. 2010.
46. The ANTARES collaboration. Contributions to the 31st International Cosmic Ray Conference (ICRC 2009), Lodz, Poland. arXiv:1002.0701v1 [astro-ph.HE] 2009.
47. J.A. Aguilar et al. Measurement of the atmospheric muon flux with a 4 GeV threshold in the ANTARES neutrino telescope. Astropart. Phys. 33 86-90. 2010.
48. H. Yepes-Ramirez, F Salesa-Greus. Proceedings of the XXXII Reunión Bienal de la Real Sociedad Española de Física and 19 Encuentro Ibérico de Enseñanza de la Física. Ciudad Real, Spain. ISBN 978-84-692-4956-7. 2009.
49. H Yepes R, P Pineda G, A Rosales-Rivera. Análisis térmico de fibra de seda de araña del género Micherecantha, familia Araneidae. Revista de la Sociedad Colombiana de Física. ISSN 0120-2650, Vol. 38, no. 2, 2006.
50. H. Yepes. KM3NeT Technical Design Report for a Deep-Sea Research Infrastructure in the Mediterranean Sea Incorporating a Very Large Volume Neutrino Telescope. Chapter 5, Section 5.3.2 "Light Transmission Measurements".

### **Technical Publications**

1. Micro-Pattern Gas Detector assembly and testing at Universidad Antonio Nariño. UAN Detectors Laboratory Technical Notes. UAN-DETLAB\_HARD\_2015\_001, 2015.
2. Running the MINOS drift calibration. MINERvA technical notes. Technical Note No 062, 2015.
3. An updated study on MINOS near detector magnetic field for MINERvA studies. MINERvA technical notes. Technical Note No 061, 2015.
4. Results of the optical properties of sea water in the ANTARES site with the optical beacon system. ANTARES internal notes. ANTARES-PHYS-2013-015, 2014.

## APPENDIX A2

### Training

#### As Speaker:

I Seminario de Detectores Instrumentación y Soluciones Tecnológicas	Villavicencio, Colombia	2016
NEXT collaboration meeting	Valencia, Spain	2015
MINERvA collaboration meeting	Batavia (IL), USA	2015
1er congreso de energía sostenible	Bogotá D.C, Colombia	2012
ANTARES collaboration meeting	Bologna, Italy	2012
ANTARES collaboration meeting	Rome, Italy	2012
ANTARES collaboration meeting	Geneve, Switzerland	2012
VLVnT11	Nürnberg, Germany	2011
TWEPP11	Vienna, Austria	2011
ANTARES collaboration meeting	Moscow, Russia	2011
ANTARES collaboration meeting (2)	Geneve, Switzerland	2011
ANTARES collaboration meeting	Paris, France	2010
IPRD10	Siena, Italy	2010
ANTARES collaboration meeting	Clermont-Ferrand, France	2010
ANTARES collaboration meeting	Geneve, Switzerland	2010
ANTARES collaboration meeting	Gandía, Spain	2009
VLVnT09	Athens, Greece	2009
XXXII Reunión Bienal Española de Física	Ciudad Real, Spain	2009
XXI Congreso Colombiano Nacional de Física	Barranquilla, Colombia	2005

#### As Assistant:

KM3NeT collaboration meeting	Nantes, France	2019
KM3NeT collaboration meeting	Tbilisi, Georgia	2019
NEXT collaboration meeting	Valencia, Spain	2016
Neurocodificación (BiiA LAB)	Bogotá D.C., Colombia	2015
NuSTEC 2014	Batavia (IL), USA	2014
MINERvA collaboration meeting	Batavia (IL), USA	2014
Energy and Engineering Excellence Summits	Brussels, Belgium	2012
MANTS 2010	Paris, France	2010
Curso de GRID y e-Ciencia	Valencia, Spain	2010
1st MULTIDARK Consolider Workshop	Madrid, Spain	2010
MANTS 2009	Berlin, Germany	2009
ANTARES Collaboration Meeting	Nürnberg, Germany	2009
RENATA 2009	A. de Henares, Spain	2009
ANTARES Collaboration Meeting	Genova, Italy	2009
SeaTray Workshop (KM3NeT)	Nürnberg, Germany	2009
ANTARES Collaboration Meeting	Marseille, France	2009
International Meeting on Fundamental Physics	Benasque, Spain	2009
International Workshop on Effective Field Theories	Valencia, Spain	2009
KM3NeT WP2 Meeting	Paris, France	2008
ISAPP 2008	Valencia, Spain	2008
Seminario de Calorimetría	Manizales, Colombia	2006
Primera Semana Técnica de Ingeniería Física	Manizales, Colombia	2002
XIX Congreso Colombiano Nacional de Física	Manizales, Colombia	2001



## **APPENDIX A3**

### **Mentoring and Jury**

#### **Mentoring**

Institution - Program: Yachay Tech University - Graduate Program on Physics  
Bachelor thesis title: "LINAC Commissioning at SIRIUS: first data and beam dynamics"  
Student: Carlos Eduardo Cocha Toapaxi.  
Date: December 2019

Institution - Program: Yachay Tech University - Graduate Program on Physics  
Bachelor thesis title: "Events selection and analysis of TXS 0506+056 in Neutrinos with KM3NeT-ARCA"  
Student: Genesis Marisol Mendoza Celorio  
Date: December 2019

Institution - Program: Yachay Tech University - Graduate Program on Physics  
Bachelor thesis title: "Events selection and analysis of TXS 0506+056 in Gammas with KM3NeT-ARCA"  
Student: Juan David Alcivar Espin  
Date: December 2019

#### **Dissertation Jury**

Institution - Program: Universidad Antonio Nariño - PhD on Applied Science.  
PhD thesis title: "Visible light communication system based on Silicon Photomultiplier: optical wireless receiver-transceiver".  
Student: Luis Fernando Castañeda Melo.  
Date: August 2016.

Institution - Program: Universidad Antonio Nariño - PhD on Applied Science.  
PhD thesis title: "Visible light communication system based on Silicon Photomultiplier: optical wireless multiple access".  
Student: Javier Fernando Castaño.  
Date: June 2016.