

# Yuber F. Perez-Gonzalez

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## Current Position

**Research Associate at the Theoretical Physics Department – Fermi National Accelerator Laboratory, Batavia, IL, USA.**

**Postdoctoral Researcher at Northwestern University, Evanston, IL, USA.**

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## Education

- 2013–2017 **Ph. D. degree in Sciences - Physics**, *Universidade de São Paulo*, São Paulo, Brazil.  
Thesis: *Massive Neutrinos: Phenomenological and Cosmological Consequences*  
Advisor: Prof. Dr. Renata Zukanovich Funchal
- 2011–2013 **Master in Sciences - Physics**, *Universidade de São Paulo*, São Paulo, Brazil.  
Dissertation (in portuguese): *Leptogênese e Mecânismo de See-Saw de tipo I na teoria quântica de campos fora do equilíbrio térmico*  
Advisor: Prof. Dr. Renata Zukanovich Funchal
- 2005–2010 **Bachelor in Physics**, *Universidad Pedagógica y Tecnológica de Colombia*, Tunja, Colombia.  
Undergraduate thesis (in spanish): *Generación de masa y oscilaciones de neutrinos de Majorana en el vacío*  
Advisor: Prof. Dr. Carlos Quimbay Herrera

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## Fellowships and awards

- 2013 – 2017 **Ph. D. Scholarship**, *Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) funding agency*, Universidade de São Paulo, São Paulo.  
Brazil
- 2013 **Ph. D. Scholarship**, *Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) funding agency*, Universidade de São Paulo, São Paulo.  
Brazil
- 2011 – 2013 **Master Scholarship**, *FAPESP funding agency*, Universidade de São Paulo, São Paulo.  
Brazil
- 2011 **Master Scholarship**, *CNPq funding agency*, Universidade de São Paulo, São Paulo.  
Brazil
- December 2010 **Graduation of honor "Miguel Jiménez López"**, *Universidad Pedagógica y Tecnológica de Colombia*, Tunja, Colombia.
- September 2010 **Undergraduate thesis cum laude**, *Universidad Pedagógica y Tecnológica de Colombia*, Tunja, Colombia.

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## Publication and preprints List

— Author's names appear in alphabetical order —

- [19] **Earth Tomography in DUNE**  
Kevin J. Kelly, Pedro A.N. Machado, (Fermilab) Ivan Martinez Soler, *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U. )  
*In preparation.*
- [18] **LEvEL: Low-Energy Neutrino Experiment at the LHC**  
Kevin J. Kelly, Pedro A.N. Machado, Alberto Marchionni (Fermilab), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U. )  
*In preparation.*
- [17] **Assessing the tension between a black hole dominated early universe and leptogenesis**  
*Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.), Jessica Turner (Fermilab)  
Submitted to Phys.Rev.Lett. [arXiv:2010.03565](https://arxiv.org/abs/2010.03565) [hep-ph]
- [16] **The physics potential of a reactor neutrino experiment with Skipper CCDs: Measuring the weak mixing angle**  
Guillermo Fernandez-Moroni, Pedro AN Machado (Fermilab), Ivan Martinez Soler, *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.), Dario Rodrigues (Buenos Aires U. & Buenos Aires, CONICET & Fermilab), Salvador Rosauero-Alcaraz (Madrid, Autonoma U.).  
Submitted to JHEP [arXiv:2009.10741](https://arxiv.org/abs/2009.10741) [hep-ph]
- [15] **Fundamental physics with the diffuse supernova background neutrinos**  
André de Gouvêa (Northwestern U), Ivan Martinez Soler (Fermilab & Northwestern U.), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.), Manibrata Sen (Northwestern U & UC, Berkeley)  
Accepted for publication in Phys.Rev.D. [arXiv:2007.13748](https://arxiv.org/abs/2007.13748) [hep-ph]
- [14] **ULYSSES: Universal LeptogeneSiS Equation Solver**  
Alessandro Granelli (SISSA), Kristian Moffat (Durham U., IPPP), *Yuber F Perez-Gonzalez* (Northwestern U. & Fermilab), Holger Schulz (Cincinnati U.), Jessica Turner (Fermilab)  
Submitted to Computer Physics Communications. [arXiv:2007.09150](https://arxiv.org/abs/2007.09150) [hep-ph]
- [13] **Back to (Mass-)Square(d) One: The Neutrino Mass Ordering in Light of Recent Data**  
Kevin James Kelly, Pedro AN Machado, Stephen J Parke (Fermilab), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U. ), Renata Zukanovich-Funchal (Sao Paulo U.)  
Submitted to Phys.Rev.Lett. [arXiv:2007.08526](https://arxiv.org/abs/2007.08526) [hep-ph]

- [12] **Measuring the Weak Mixing Angle in the DUNE Near Detector Complex**  
André de Gouvêa (Northwestern U), Pedro AN Machado (Fermilab), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.), Zahra Tabrizi (Campinas State U.).  
Phys.Rev.Lett. 125 (2020) 5, 051803, arXiv: 1912.06658[hep-ph]
- [11] **Dirac and Majorana neutrino signatures of Primordial Black Holes**  
Cecilia Lunardini (Arizona State U.), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.).  
JCAP 08 (2020) 014, arXiv:1910.07864 [hep-ph]
- [10] **Sub-GeV Atmospheric Neutrinos and CP-Violation in DUNE**  
Kevin James Kelly, Pedro AN Machado (Fermilab), Ivan Martinez Soler (Fermilab & Northwestern U.), Stephen J Parke (Fermilab), *Yuber F Perez-Gonzalez* (Fermilab & Northwestern U.).  
Phys.Rev.Lett. 123 (2019) 8, 081801, arXiv: 1904.02751[hep-ph]
- [9] **Z's in neutrino scattering at DUNE**  
Peter Ballett, Matheus Hostert, Silvia Pascoli (Durham U., IPPP), *Yuber F Perez-Gonzalez* (ICTP-SAIFR, Sao Paulo & Sao Paulo, IFT & Fermilab & Northwestern U.), Zahra Tabrizi and Renata Zukanovich Funchal (Sao Paulo U.).  
Phys.Rev. D100 (2019) 5, 055012 , arXiv:1902.08579 [hep-ph]
- [8] **Neutrino Trident Scattering at Near Detectors**  
Peter Ballett, Matheus Hostert, Silvia Pascoli (Durham U., IPPP), *Yuber F Perez-Gonzalez*, Zahra Tabrizi and Renata Zukanovich Funchal (Sao Paulo U.).  
JHEP01(2019)119, arXiv:1807.10973 [hep-ph]
- [7] **A natural neutrino mass mechanism at the electroweak scale.**  
Julia Gehrlein (Madrid, Autonoma U. & Madrid, IFT), Dorival Gonçalves (Pittsburgh U.), Pedro A. N. Machado (Fermilab) and *Yuber F Perez-Gonzalez* (Sao Paulo U.).  
Phys.Rev. D98 (2018) no.3, 035045 , arXiv:1804.09184 [hep-ph]
- [6] **Dark Matter Direct Detection Discovering Limit including Non-Standard Interactions.**  
M.C. Gonzalez-Garcia (Barcelona U. & ICC, Barcelona U. & ICREA, Barcelona & YITP, Stony Brook), Michele Maltoni (Madrid, Autonoma U. & Madrid, IFT), *Yuber F Perez-Gonzalez* and Renata Zukanovich Funchal (Sao Paulo U.).  
JHEP 1807 (2018) 019, arXiv:1803.03650 [hep-ph]
- [5] **Impact of Beyond the Standard Model Physics in the Detection of the Cosmic Neutrino Background.**

Martín Arteaga, Enrico Bertuzzo, *Yuber F. Perez-Gonzalez* and Renata Zukanovich Funchal (Sao Paulo U.).

JHEP 1709 (2017) 124, [arXiv:1708.07841 \[hep-ph\]](#)

[4] **Constraints from Triple Gauge Couplings on Vectorlike Leptons.**

Enrico Bertuzzo (Sao Paulo U.), Pedro A. N. Machado (Fermilab), *Yuber F. Perez-Gonzalez* and Renata Zukanovich Funchal (Sao Paulo U.)

Phys.Rev. D96 (2017) no.3, 035035, [arXiv:1706.03073 \[hep-ph\]](#)

[3] **Dark Matter and Exotic Neutrino Interactions in Direct Detection Searches.**

Enrico Bertuzzo (Sao Paulo U.), Frank F. Deppisch (U. Coll. London), Suchita Kulkarni (Vienna, OAW), *Yuber F. Perez-Gonzalez* and Renata Zukanovich Funchal (Sao Paulo U.)

JHEP 1704 (2017) 073, [arXiv:1701.07443 \[hep-ph\]](#)

[2] **Limits on Neutrinophilic Two-Higgs-Doublet Models from Flavor Physics.**

Enrico Bertuzzo, *Yuber F. Perez G.* (Sao Paulo U.), Olcyr Sumensari (Orsay, LPT & Sao Paulo U.) and Renata Zukanovich Funchal (Sao Paulo U.).

JHEP 1601 (2016) 018, [arXiv:1510.042284 \[hep-ph\]](#)

[1] **On the Viability of Minimal Neutrinophilic Two-Higgs-Doublet Models.**

P.A.N. Machado (Madrid, Autonoma U. & Madrid, IFT), *Y. F. Perez* (Sao Paulo U.), O. Sumensari (Orsay, LPT & Sao Paulo U.), Z. Tabrizi (Campinas State U. & IPM, Tehran) and R. Zukanovich Funchal (Sao Paulo U.).

JHEP 1512 (2015) 160, [arXiv:1507.07550 \[hep-ph\]](#)

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## Languages

Spanish **Fluent**, *Mother Language*.

Portuguese **Fluent**.

English **Fluent**.

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## Teaching experience

Teacher assistant **Physics III**, *Undergraduate program*, Universidade de São Paulo.

Teacher assistant **Methods of Theoretical Physics**, *Undergraduate program*, Universidade de São Paulo.

Teacher assistant **Quantum Mechanics I**, *Graduate program*, Universidade de São Paulo.

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## Computer skills

Languages	C++, Fortran, Python.
Operating Systems	Linux, Windows, macOS.
Other	FeynCalc, FeynRules, GSL, FLUKA, Mathematica, L <sup>A</sup> T <sub>E</sub> X.

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## Invited Talks

- 2020 **SLAC Elementary Particle Physics - Theory Seminar, Menlo Park, CA, USA.**  
*Online Talk:* Neutrinos from Primordial Black Holes: An Unexpected Interplay
- 2020 **Snowmass – EF04 Topical Group Community Meeting, USA.**  
*Online Talk:* Electroweak precision measurements in low energy neutrino experiments
- 2020 **Mitchell Institute Seminar, Texas A& M University, College Station, TX, USA.**  
*Online Talk:* Neutrinos from Primordial Black Holes: An Unexpected Interplay
- 2020 **Network in Neutrinos, Nuclear Astrophysics and Symmetries – Virtual Seminar, Evanston, IL, USA.**  
*Online Talk:* On massive neutrino emission from primordial black holes via Hawking radiation
- 2020 **Center for neutrino physics seminar, Virginia Tech, Blacksburg, VA, USA.**  
*Online Talk:* The cosmic neutrino background and other potential neutrino relics
- 2019 **Neutrino Platform Week 2019: Hot Topics in Neutrino Physics, Geneva, Switzerland.**  
*Talk:* Dirac and Majorana neutrino signatures of Primordial Black Holes
- 2019 **Neutrino Theory Network Workshop on Neutrino Non-Standard Interactions, Saint Louis, MI, USA.**  
*Talk:* Neutrino Non-Standard Interactions in Dark Matter Direct Detection Experiments
- 2019 **Arizona State University, Cosmology Seminar, Tempe, AZ, USA.**  
*Talk:* Neutrinos in Dark Matter detection experiments: Standard Model and Beyond.
- 2018 **Physics Opportunities in the Near DUNE Detector Hall, Batavia, IL, USA.**  
*Talk:* Neutrino Tridents at Near Detectors
- 2018 **NuTheories: Beyond the  $3 \times 3$  Paradigm, Pittsburgh, PA, USA.**  
*Talk:* Natural and Dynamical Neutrino Mass Mechanism at the LHC

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## Contributed Talks

- 2020 **Phenomenology in Illinois, Kentucky, Indiana, Michigan, and Ohio (PIKIMO)-9, Lexington, KY, USA.**  
*Online Talk:* Neutrinos from Primordial Black Holes: An Unexpected Interplay
- 2020 **XXIX International Conference on Neutrino Physics and Astrophysics, Chicago, IL, USA.**  
*Online Poster:* The Weak mixing angle in the DUNE near detector complex
- 2020 **Neutrinos from the Lab to the Cosmos, Seattle, WA, USA.**

- Talk:* Dirac and Majorana neutrino signatures of Primordial Black Holes
- 2018 **XXVIII International Conference on Neutrino Physics and Astrophysics**, Heidelberg, Germany.  
*Poster:* Impact of Beyond the Standard Model Physics in the Detection of the Cosmic Neutrino Background
- 2017 **South American Dark Matter Workshop**, São Paulo, Brazil.  
*Talk:* Dark Matter and Exotic Neutrino Interactions in Direct Detection Searches
- 2016 **Invisibles16 Workshop**, Padova, Italy.  
*Talk:* Constraining Dark Matter – Neutrino Interactions at Direct Detection Experiments
- 2015 **Invisibles15 Workshop**, Madrid, Spain.  
*Talk:* Viability of Minimal Neutrinophilic two-Higgs-Doublet Models
- 2014 **Invisibles14 Workshop**, Paris, France.
- 2013 **XXIV Workshop on Weak Interactions and Neutrinos**, Natal, Brazil.
- 2013 **2013 International Workshop on Baryon and Lepton Number Violation**, Heidelberg, Germany.  
*Poster:* Leptogenesis and Type I See-Saw Mechanism in the Schwinger-Keldysh Formalism

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## Summer schools

- 2015 **Invisibles15 Summer School**, Miraflores de la Sierra, Spain.
- 2014 **Invisibles14 Summer School**, Gif-Sur-Yvette, France.
- 2012 **The 2012 FeynRules/MadGraph school on LHC Phenomenology**, Natal, Brazil.
- 2012 **PASI2012, Exploring the terascale and beyond**, Buenos Aires, Argentina.

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## Other

**Referee for JHEP.**

**Organizer of the Neutrino Seminar Series, 2020-2021, at Fermilab, Batavia, IL, USA.**

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## References

### **Prof. Dr. Renata Zukanovich Funchal**

Departamento de Física Matemática,

Instituto de Física, Universidade de São Paulo

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### **Prof. Dr. André de Gouvêa**

Department of Physics and Astronomy,  
Northwestern University

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### **Dr. Pedro A. N. Machado**

Theoretical Physics Department,  
Fermi National Accelerator Laboratory

e-mail: pmachado@fnal.gov

**Prof. Dr. Cecilia Lunardini**

Department of Physics,  
Arizona State University

e-mail: [Cecilia.Lunardini@asu.edu](mailto:Cecilia.Lunardini@asu.edu)

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**Web pages**

InSpires

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Google Scholar

[https://scholar.google.com.br/citations?hl=pt-BR&user=pP4pr8sAAAAJ&view\\_op=list\\_works&sortby=pubdate](https://scholar.google.com.br/citations?hl=pt-BR&user=pP4pr8sAAAAJ&view_op=list_works&sortby=pubdate)