JORGE TORRES

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EDUCATION

The Ohio State University, Columbus, Ohio USA May 2021
Ph.D. in Physics–Advisor: Prof. Amy Connolly
Master of Science in Physics, July 2017

Universidad de Colima, Colima, Mexico. August 2015
Bachelor of Science in Physics–Advisor: Alfredo Aranda

CURRENT POSITION

Yale University, New Haven, Connecticut USA **July 2021** –
Postdoctoral Researcher, Neutrinoless double beta decay (CUORE/CUPID experiments) in Karsten Heeger's/Reina Maruyama's Lab.

CUORE

- Part of the team conducting CUORE's neutrinoless double beta decay search with 2 ton-years of exposure. In particular, leading the system response analysis of the detector.
- Convener for the muon-veto and neutron shield working group for CUPID.
- Leading a study, along with and MIT graduate student, to reconstruct muon tracks with CUORE and measure the muon flux at Hall A of LNGS with CUORE. This study will serve to validate our CUORE and CUPID muon simulations, and will allow a subsequent study on muon-induced backgrounds.
- CUORE Software coordinator for data collection and high level analysis for CUORE's 2 ton-year analysis.
- Member of CUORE's Publication Board, which oversees the publication of CUORE's papers.

CUPID

- Leading the team that is currently designing the muon-veto for CUORE/CUPID at Yale's Wright Lab. This team consists of three Yale graduate students and two undergraduate students.
- Deployed to LNGS to lead the commissioning of prototype modules of the muon-veto system.
- Level 3 manager for CUPID's muon-veto system and neutron shield. Leading the background characterization of muon backgrounds for CUPID and planning mitigation strategies.

PREVIOUS POSITIONS

The Ohio State University, Columbus, OH USA **Fall 2015 – June 2021**
PhD Student, Ultra-High Energy Neutrino Astrophysics (Askaryan Radio Array, T-576 experiment)

- Developer of the simulation framework for the Askaryan Radio Array (ARA) collaboration. Several contributions include noise modeling for stations and signal polarization treatment.
- ARA data analysis: part of the team that led the diffuse search for ultra-high energy neutrinos in four years of data for ARA stations 2 and 3 (published in Phys. Rev. D). Developed tools for a point source search of ultra-high energy neutrinos using the same dataset as in the diffuse analysis, including cuts from polarization reconstruction work.

- Led work on polarization reconstruction of Askaryan signals and estimated directional reconstruction capabilities of ARA.
- Founder and convener of the ARA Sources/Reconstruction working group.
- Member of the InIceMC simulation group, aimed at improving simulations of radio-based UHE in-ice neutrino experiments.
- Led the validation campaign of two different in-ice radio experiments simulation packages.
- Deployed to SLAC National Accelerator Laboratory for a week with a team of 3 other people to construct and carry out the experiment T-576 to detect radio-frequency waves bouncing off particle showers.
- ARA operations coordinator for two years.
- ARA weekly analysis calls organizer and moderator.

SELECTED PUBLICATIONS

5. "Snowmass Early Career"
   Snowmass Early Career (SEC) organization
   [arXiv:2210.12004].
4. "Constraints on the Diffuse Flux of Ultra-High Energy Neutrinos from Four Years of Askaryan Radio Array Data in Two Stations"
   P. Allison *et. al.* (**co-author**)
   Phys. Rev. D 102, 043021 (2020) [arXiv:1912.00987].
3. "Observation of Radar Echoes From High-Energy Particle Cascades"
   S. Prohira *et. al.* (incl. **J. A. Torres**)
   Phys Rev Lett. 2020 Mar 6;124(9):091101. [arXiv:1910.12830].
2. "NuRadioMC: Simulating the radio emission of neutrinos from interaction to detector"
   C. Glaser *et. al.* (incl. **J. A. Torres**)
   Eur.Phys.J. C80 (2020) no.2, 77. [arXiv:1906.01670].
1. "Suggestion of Coherent Radio Reflections from an Electron-Beam Induced Particle Cascade"
   S.Prohira *et. al.* (incl. **J. A. Torres**)
   Phys. Rev. D 100, 072003 (2019). [arXiv:1810.09914].

INVITED TALKS

7. Invited talk, 6th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan (rescheduled to a later date due to Maui fires)
   Big Island, HI. 2023/12/01
   Searching for $0\nu\beta\beta$ decay with CUORE and CUPID
6. Invited talk, HEP Seminar
   Michigan State University, East Lansing, MI. 2022/11/08
   Searching for $0\nu\beta\beta$ decay with CUORE... and beyond
5. Invited talk, Seminario de Altas Energías
   UNAM, Mexico. 2022/05/25
   Searching for $0\nu\beta\beta$ decay with CUORE
4. Invited talk, GAE (Grupo de Altas Energias) Seminar
   CINVESTAV, Mexico. 2022/02/25
   Searching for $0\nu\beta\beta$ decay with CUORE
3. Invited talk, Wright Lab WIDG Seminar
   Wright Lab, Yale Physics Dept, New Haven CT, USA. 2021/10/26
   Tuning into neutrinos on the radio with the ARA experiment

2. Invited plenary talk, XIX Mexican School of Particles and Fields
Held remotely due to COVID-19 2021/08/10
Tuning into neutrinos on the radio

1. Invited talk, UMASS Dartmouth Physics Department Colloquium
Held remotely due to Covid-19 pandemic. 2020/10/15
Tuning into neutrinos on the radio

CONTRIBUTED TALKS AND POSTERS

13. Contributed talk, APS DNP Fall Meeting, New Orleans LA. 2022/10/28
CUPID: a next-generation $0\nu\beta\beta$ decay experiment

12. Poster, Seattle Snowmass Summer Meeting, Seattle WA. 2022/07/19
CUPID: a next-generation $0\nu\beta\beta$ decay experiment

11. Poster, Neutrino 2022, Seoul, Korea (Virtual). 2022/05/30
Mitigation of cosmic muon backgrounds for CUPID

10. Contributed talk, APS April Meeting, New York, NY. 2022/04/11
Design of a muon-veto system for the CUPID experiment

9. Contributed talk, APS April Meeting, held remotely due to COVID-19 2021/04/19
Reconstruction of UHE neutrinos with the Askaryan Radio Array (ARA) experiment

8. Poster, Cosmic Rays and Neutrinos in the Multi-Messenger Era
Held remotely due to Covid-19 pandemic. 2020/12/07
Recent results from the Askaryan Radio Array (ARA) experiment

7. Contributed talk, 2020 Graduate Student Summer Seminar Series, Columbus OH. 2020/06/30
Ultra-High Energy Neutrinos: Physics, detection, and recent results from the Askaryan Radio Array (ARA) experiment

6. Contributed talk, APS April Meeting, held remotely due to COVID-19 2020/04/19
Recent results from the Askaryan Radio Array (ARA) experiment

5. Contributed talk, Graduate Student Summer Seminar Series, Columbus OH. 2019/07/17
Ultra-High Energy Neutrinos: Physics and Detection

4. Contributed talk, Radio-Workshop, DESY (Zeuthen), Germany. 2019/06/19
Validation of in-ice simulations

3. Contributed talk, APS April Meeting, Denver CO. 2019/04/15
Simulations of radio-based Ultra-High Energy (UHE) in-ice neutrino experiments

2. Contributed talk, Ohio Supercomputer Center Statewide Users Group Conference,
Columbus, OH. 2018/04/05
The role of HPC in the radio-detection of astrophysical neutrinos

1. Contributed talk, Computing in High Energy Astropart. Phys. Research 2016,
Columbus OH. 2016/05/26
The BuckArray: detecting cosmic rays with cellphones

OUTREACH TALKS

10. Pint of Postdoc, by the Yale Postdoctoral Association
New Haven CT, USA. 2023/05/31
Neutrinos: the ghost-like particles

9. Union County Magnet High School
NJ, USA. 2023/05/05
Neutrinos: the ghost-like particles

8. Instituto Heisenberg
   Universidad de Colima, Colima, Mexico. 2023/04/01
   Neutrinos: las partículas cuasi-fantasmas

7. Snowmass Summer Study Physics Slam [**winner**]
   University of Washington, Seattle, WA. 2022/07/21
   Neutrinos: the ghost-like particles

6. Girls Advancing in STEM (GAINS) Conference
   Yale University, New Haven, CT. 2022/04/08
   Neutrinos: the ghost-like particles

5. Yale Science in the News talk (series: Hidden things)
   Brookfield Library, Connecticut, USA. 2022/02/24
   ν's from outer space, observing the Universe with neutrinos

4. Yale Science in the News talk (series: Hidden things)
   SSILL, Connecticut, USA. 2022/02/23
   ν's from outer space, observing the Universe with neutrinos

3. Yale Science in the News talk (series: Hidden things)
   New Canaan Library, Connecticut, USA. 2022/02/17
   ν's from outer space, observing the Universe with neutrinos

2. Yale Science in the News talk (series: Hidden things)
   Brooklyn Public Library, New York, USA. 2022/02/15
   ν's from outer space, observing the Universe with neutrinos

1. Talk (high school students), Instituto Heisenberg
   Universidad de Colima, Colima, Mexico . 2019/05/19
   Stories from a physics PhD student in the US

RELEVANT SKILLS

Programming/Software	C++, C, Python, BASH, LaTeX, Git, Geant4, ROOT, Data science
Languages	Spanish (Native), English (Full professional proficiency)

AWARDS

- Winner of the Snowmass Summer Study Physics Slam 07/2022
- Selected poster at the Hayes Research Forum 02/2020
  My abstract was selected among two hundred other abstracts to participate in the research forum and present a poster on my work.
- APS Division of Astrophysics Travel Grant to attend the APS April Meeting 04/2019
  My abstract was selected, and I was awarded $600 (USD) to cover travel expenses for the APS April Meeting.
- Ohio SuperComputer Center Statewide Users Group Conference Talk Award 10/2017
  I received this award for getting second place in their 5-minute talk competition.

TEACHING

Teaching Assistant, "Physics 1201:E&M, Optics and Quantum Mechanics", OSU Spring 2018–Summer 2018
Teaching Assistant, "Physics 1250: Mech, Thermo, Waves", OSU Fall 2015–Spring 2017

OUTREACH AND SERVICE

Panelist at "How to prepare for scientific conferences" workshop at Wright Lab July 18, 2023
Executive member of the 2023 Yale Physics Olympics April, 2023
Mentor at the APS DNP Conference Experience for Undergraduates October, 2022

Postdoc representative for the Yale Physics Club Committee	October, 2022 – October 2023
Yale Science In The News (SITN) Director	September, 2022 – August, 2023
Project lead for Yale Pathways to Science	July 13th, 2022
Speaker at Girls Advancing in STEM (GAINS) Conference	April 8th, 2022
Organizer of "Big Questions in Particle Physics" Snowmass Colloquia	October 2021 – June 2022
Member of the Snowmass Early Career Core Initiatives Leadership	September 2021 – August 2022
Creator and organizer of the *Elusives Journal Club* at Yale Wright Lab	August 2021 – January 2023
Delegate, Council of Graduate Students (CGS), OSU	August 2019–August 2020
Volunteer for "Friends of Ohio State Astronomy and Astrophysics" (FOSAA) event	October 2019
Volunteer for Breakfast of Science Champions, OSU	November 2019
Volunteer Poster Judge, Ohio Supercomputer Center	April 2018–August 2020
Counsel member for the Society for Women in Physics (SWiP), OSU	August 2017–December 2018
Coordinator for ASPIRE Workshop for High School Girls, OSU	July 2017–July 2020

MENTORSHIP

At Yale:

Graduate Students:	Ridge Liu, Maya Moore, Samantha Pagan, Iris Ponce, Emily Pottebaum.
Undergraduate Students:	Iffat Zarif, Aaron Chizhik, Din-Ammar Tolj, Andrew Hutchison (student at MIT), Jackie Hua, Andrew Zheng.

At Ohio State:

Graduate Students:	Dennis Calderon-Madera, Julie Rolla, Justin Flaherty, Dylan Frikken
Undergraduate Students:	Ian Best, Hannah Hassan, Alex Machtay, Alex Patton

SOFTWARE PROJECTS

- Lobster Plot: Code to make the so-called "Lobster Plot", developed from code that previous Yale grad. student Jeremy Cushman wrote. Website: `https://toej93.github.io/LobsterPlot/`.