# Hugo Alberto Ayala Solares

**PhD Physics**

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## SUMMARY OF QUALIFICATIONS

***Ph.D. physicist that is always trying to learn and apply new knowledge. My current focus is in observational astrophysics. I apply statistical tools and probability to find interesting events in the data. I also use optimization methods to find models that describe the data with frequentist and bayesian statistics. I perform simulations to characterize analyses. I manage and maintain a real-time system that receives and analyze large datasets.I have experience working with large collaborations as well as leading smaller groups within them.***

## TECHNICAL SKILLS

***Python***
*Numpy, Matplotlib, Scipy, Pandas, TensorFlow, Astropy*

***C++***

***Bash***

***Git***

***MySQL***

***LaTex***

***Data Structures and Algorithms***
*Optimization*

***Machine Learning***
*Clustering, Classification*

***Probability***
*Frequentist, Bayesian*

***Statistical Analysis***
*Parameter estimation, regression*

***Physics***

## BUSINESS AND SOCIAL SKILLS

***Effective communicator***

***Presentation skills***

***Adaptable to different audiences***

***Lead collaborative teams***

***Process oriented***

***Fast learner***

***Strategic thinking***

## WORK EXPERIENCE

### PostDoctoral Researcher

Pennsylvania State University

May 2017 – Ongoing | State College, PA, United States

- Builiding and maintaining the Astrophyiscal Multimessenger Observatory Network (AMON).
  - Develop coincidence analyses between different datasets to find candidate astrophysical multimessenger sources.
  - Search for sources of gamma-ray and neutrino emission by using a multimessenger approach.
- Member of the High Altitude Water Cherenkov (HAWC) Observatory.
  - Study gamma-ray emission from large-scale structures with HAWC data. Calculating credible intervals on the amount of emission of these sources.
  - Extragalactic and Multimessenger/Multiwavelenght coordinator in HAWC.
- Associate Member of the IceCube Neutrino Observatory.
- Presented work in more than 10 conferences and collaboration meetings in the past 3 years.

### Ph.D. Researcher

Michigan Technological University

2011-2017 | Houghton,MI,United States

- Created and maintained laser calibration system of the HAWC detector.
- Developed optimization algorithms to reconstruct astrophysical events.
- Developed a statistical analysis to search for weak signal in high-level background

### Research Intern

Photonics and Mathematical-Optics Group, ITESM

Spring 2011 — Monterrey, N.L. Mexico

- Studied equations for spiral profiles of light after passing through birefringent objects.

## EDUCATION

### Ph.D. in Physics focused on Astrophysics

Michigan Technological University

September 2011 – April 2017 — Houghton, MI, United States

Thesis title: Search for High-Energy Gamma Rays in the Northern Fermi Bubble Region with the HAWC Observatory

### B.Sc. in Engineering Physics

Instituto Tecnológico y de Estudios Superiores de Monterrey

August 2006 – December 2010 — Monterrey, N.L., Mexico

## LANGUAGES

***Spanish***
*Native Language*

***English***
*Fluent*

***German***
*Intermediate*

## LATEST PUBLICATIONS

### Journal Articles


- Ayala Solares, H.A. et al. (2021). "Multimessenger Gamma-Ray and Neutrino Coincidence Alerts using HAWC and IceCube sub-threshold Data". In: *ApJ* 906, p. 63. DOI: https://doi.org/10.3847/1538-4357/abcaa4.
- Solares, Hugo A. Ayala et al. (2020). "The Astrophysical Multimessenger Observatory Network (AMON): Performance and science program". In: *Astroparticle Physics* 114, pp. 68–76. ISSN: 0927-6505. DOI: https://doi.org/10.1016/j.astropartphys.2019.06.007. URL: http://www.sciencedirect.com/science/article/pii/S0927650519301227.
- Ayala Solares, Hugo Alberto (2019). "AMON Multimessenger Alerts: Past and Future". In: *Galaxies* 7.1. ISSN: 2075-4434. DOI: 10.3390/galaxies7010019. URL: https://www.mdpi.com/2075-4434/7/1/19.
- Solares, H. A. Ayala et al. (2019). "A Search for Cosmic Neutrino and Gamma-Ray Emitting Transients in 7.3 yr of ANTARES and Fermi LAT Data". In: *The Astrophysical Journal* 886.2, p. 98. DOI: 10.3847/1538-4357/ab4a74. URL: https://doi.org/10.3847%2F1538-4357%2Fab4a74.


## AWARDS

- Funding from Swift Guest Investigator Program NASA Cycle 15
- Funding from Swift Guest Investigator Program NASA Cycle 16