WILLIAM LUSZCZAK

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EDUCATION

University of Wisconsin, Madison *June 2016–August 2021*
Ph.D. in Physics. Thesis: *Every Flare, Everywhere: Untriggered Searches for Astrophysical Neutrino Transients Using Data from the IceCube Detector*

University of California, Santa Barbara *September 2012–June 2016*
B.Sc. in Physics

POSTDOCTORAL EXPERIENCE

Ohio State University September 2021–Present
Postdoctoral Fellow, Center for Cosmology and AstroParticle Physics *Columbus, OH*

SELECTED PUBLICATIONS AND PROCEEDINGS

I have many publications across the fields of astroparticle physics and atmospheric science. Some of my most notable works include simulation and experimental studies laying the foundation of atmospheric muography, and public data releases of astrophysical neutrino data observed by the IceCube Collaboration.

- W. Luszczak, J. Houser, M. Kauer. *Atmospheric Muon Flux Measurements Near the Base of a Forming EF-3 Tornado*, paper in prep.
- IceCube Collaboration: M. G. Aartsen et al. *IceCube Data for Neutrino Point-Source Searches: Years 2008–2022*, paper (and data release) under collaboration review.
- W. Luszczak, J. Chan. *Using Cosmic Rays to Predict the Weather: Meteorological Data Assimilation of Atmospheric Muon Flux Data*, Submitted to PRD [arXiv:2509.04627]
- W. Luszczak, L. Orf. *The Effect of Tornadic Supercell Thunderstorms on the Atmospheric Muon Flux*, Phys. Rev. D 111, 023018 [arXiv:2405.19311]
- IceCube Collaboration: M. G. Aartsen et al. *IceCube Search for Neutrino Emission from X-ray Bright Seyfert Galaxies*, ApJ 988 141 [arXiv:2406.07601]
- W. Luszczak. *TXS 0506+056 With Updated IceCube Data*, ICRC 2023, Nagoya Japan. PoS(ICRC2023)1465 [arXiv:2307.14559]
- W. Luszczak, K. Hughes, Q. Abarr. *A New Simulation Framework for the PUEO Experiment*, ICRC 2023, Nagoya Japan. PoS(ICRC2023)1154
- A. Bishop, A. Cummings, R. Krebs, W. Luszczak. *Benefits of Looking for Coincident Events, Taus, and Muons with the Askaryan Radio Array*, ICRC 2023, Nagoya Japan. PoS(ICRC2023)1169.
- IceCube Collaboration: M. G. Aartsen et al. *Observation of high-energy neutrinos from the Galactic Plane*, Science 380, 6652, 1338-1343 (2023) [arXiv:2307.04427]
- IceCube Collaboration: M. G. Aartsen et al. *Evidence for neutrino emission from the nearby active galaxy NGC 1068*, Science 378, 6619, 538-543 (2022) [arXiv:2211.09972]
- IceCube Collaboration: M. G. Aartsen et al. *IceCube Data for Neutrino Point-Source Searches: Years 2008-2018*, 2021-01-26, Data set [arXiv:2101.09836]

- W. Luszczak, F. Lucarelli. *Every Flare, Everywhere: An All-Sky Untriggered Search for Astrophysical Neutrino Transients Using IceCube Data*, ICRC 2021, Berlin Germany. PoS(ICRC2021)1128 [arXiv:2107.12134]
- W. Luszczak, J. Braun, A. Karle. *A Method for an Untriggered, Time-Dependent, Source-Stacking Search for Neutrino Flares*, ICRC 2019, Madison WI. PoS(ICRC2019)950 [arXiv:1908.05637]
- B. Monreal, L. de Viveiros, W. Luszczak. *Sub-Penning gas mixtures: new possibilities for ton- to kiloton-scale time projection chambers* [arXiv:1512.04926]

PUBLICATIONS AND PROCEEDINGS (OTHER)

As a key member of the IceCube collaboration, I am listed as an author on a large number of papers. A complete list of my publications can be found by simply searching my name on arXiv: `https://arxiv.org/search/?searchtype=author&query=Luszczak%2C+W`.

RESEARCH FUNDING AWARDED

I have obtained funding for both atmospheric and astroparticle work.

President's Research Excellence (PRE) Accelerator Award 2025-2026
Proposal: *Revolutionizing Observations of Severe Thunderstorms Using Cosmic Ray Muography*
Award Amount: $50k/1 year

OSU CCAPP Postdoctoral Fellowship 2021-2026
Award Amount: $8k/year for 5 years

OTHER AWARDS

IceCube Impact Award 2021

UW Van Vleck Fellowship 2016

PRESS COVERAGE

The atmospheric muography component of my research program has notably attracted attention from the press, likely due to its existence at the interface of (in my opinion) two individually very cool fields.

- *Cosmic rays could help reveal how tornadoes form.* Emily Conover for ScienceNews. January 8, 2025. `https://www.sciencenews.org/article/cosmic-rays-muons-tornadoes`
- *A cosmic tool for studying twisters and other severe storms.* Tatyana Woodall for Ohio State News. July 11, 2024. `https://news.osu.edu/a-cosmic-tool-for-studying-twisters-and-other-severe-storms/`

INVITED TALKS

Over the years, I have been invited to give a variety of talks, spanning showcases of my research, technical talks, and outreach talks for non-academic audiences.

- *Not Your Grandparent's Astronomy: Exploring the Universe with Neutrinos*, Cleveland Astronomical Society Lecture. December 4, 2025
- *Atmospheric Muon Flux Observations Near the Base of an EF-3 Tornado*, WIPAC Astroparticle Group Seminar. October 10, 2025

- *What is Particle Astrophysics, and Why Does It Matter?*, University of Melbourne Astroparticle Seminar. October 6, 2025.
- *Putting Muon Detectors Near Tornadoes (and Why That Might Be a Good Idea)*, OSU ASPIRE Workshop. June 16, 2025
- *Putting Muon Detectors Near Tornadoes (and Other Adventures in Astroparticle Meteorology)*, UChicago KICP Seminar. April 10, 2025
- *Using Astroparticle Physics to Study Tornadoes*, Science N' Suds Night at Parson's North. November 7, 2024
- *Not Your Grandparent's Astronomy: Exploring the Universe with Neutrinos*, Baldwin Wallace University Reinhold and Margaret Kader Memorial Lecture Series. September 14, 2024
- *New Developments in Nu Astronomy*, Penn State GAPP Seminar. September 19, 2023
- *Searching for Ultrahigh Energy Neutrinos with PUEO*, University of Cincinnati High Energy Physics Seminar. November 15, 2022
- *Introduction to Statistics and Point Source Methods in Neutrino Astronomy*, IceCube Bootcamp 2021. June 8 2021.
- *Every Flare, Everywhere: Untriggered Searches for Astrophysical Neutrino Transients with IceCube Data*, OSU CCAPP Astroparticle Seminar, December 18, 2020

OTHER TALKS AND POSTERS

- *Using Cosmic Ray Measurements in Meteorological Data Assimilation*, ISDA 2025, Melbourne, Australia. September 29, 2025.
- *Physics 5700 Near the Base of a Forming EF-3 Tornado*, OSU CCAPP Astroparticle Symposium. September 18, 2025.
- *Astroparticle Fill-In-The Blank: Using Atmospheric Muons to Study Tornadoes*, OSU CCAPP Astroparticle Symposium. September 26, 2024.
- *Astroparticle Fill-In-The Blank: Using Atmospheric Muons to Study Tornadoes*, TeVPA 2024, Chicago, IL. Aug 26, 2024.
- *Beyond TeV: Searching for Ultrahigh Energy Neutrinos with PUEO*, TeVPA 2023, Napoli, Italy. September 11, 2023.
- *TXS 0506+056 With Updated IceCube Data*, ICRC 2023, Nagoya, Japan. July 28, 2023
- *Updated Simulation of Airborne Neutrino Detectors for the PUEO Experiment*, ICRC 2023, Nagoya, Japan. July 29, 2023 (Poster).
- *Not Your Grandparent's Astronomy: Observing the High-Energy Universe with Neutrinos*, OSU FOSAA talk, May 20, 2023.
- *TXS 0506+056 With Updated IceCube Data*, APS April 2023, Minneapolis, MN. April 15, 2023
- *Let's Talk about TXS 0506+056*, OSU CCAPP Astroparticle Symposium. September 30, 2022.
- *Not Your Grandparent's Astronomy: Searching for the Origins of the Astrophysical Neutrino Flux*, OSU CCAPP Astroparticle Symposium. October 8, 2021.
- *Every Flare, Everywhere: Untriggered Searches for Astrophysical Neutrino Transients with IceCube Data*, APS April 2021 (Virtual). April 19, 2021

- *A New Method for an Untriggered, Source Stacking Search for Neutrino Flares*, TeVPA 2019, Sydney, NSW, Australia. December 3, 2019.
- *A Method for an Untriggered, Time-Dependent,Source-Stacking Search for Neutrino Flares*, ICRC 2019, Madison, WI. July 24-August 1, 2019 (Poster).
- *Recent Developments in Calibration of the IceCube Detector*, APS April Meeting 2018, Columbus, Ohio. April 15, 2018.
- *Bigger, Cheaper Detectors: Simulations of Electron Drift for Use in Salt Cavern Detectors*, UCSB Undergraduate Summer Research Symposium, KITP. September 11, 2015.

COLLABORATION LEADERSHIP

IceCube

Data Curator for the IceCube Neutrino Sources Group, 2023-Present

PUEO

Software and Simulations Group Lead, 2021-2025

SCIENTIFIC SOFTWARE CONTRIBUTIONS

The following software repositories are private, and only viewable by collaboration members. Please contact me if you would like to view.

PueoSim and NiceMC

Developer and maintainer of the simulation software for the PUEO collaboration.

cSky

Developer and maintainer of the IceCube neutrino sources analysis software (cSky). Used for most IceCube point source analyses since 2019.

SkyLab

Contributed to the development of the time-dependent portion of the python-based Skylab point source likelihood framework used by the IceCube collaboration.

TEACHING EXPERIENCE

Teaching Consultant January 2019 – May 2019
UW-Madison Statistics Department

Assisted in teaching Statistics 998: Statistical Consulting. Taught graduate students in the UW Madison Statistics department about statistical problems in physics. Worked with students to develop novel solutions and reviewed reports at the end of the semester.

Teaching Assistant January 2017 – May 2017
UW-Madison Physics Department

TA for Physics 104: Principles of electricity and magnetism, light, optics, and modern physics, with applications to a number of different fields. Two discussion sections and two two-hour labs per week.

Undergraduate Tutor September 2014 – June 2016
UCSB Physics Department

Tutor for introductory physics courses and select advanced courses, covering the majority of undergraduate physics curriculum.

Grader April 2015 - June 2015
UCSB Physics Department

Grader for Astro 2: Modern extragalactic astronomy, active galactic nuclei, dark matter, gravitational lenses, and additional related topics. Approximately 100 students.

OUTREACH

OSU Aspire Workshop 2025 `https://u.osu.edu/aspire/`

Summer workshop for local high-school students. Students learn about and do activities related to physics research at OSU

Science N Suds Nights `https://www.parsonsnorth.com/add-events/science-n-suds`

Public lecture series hosted at a local brewery

Friends of Ohio State Astronomy & Astrophysics `https://astronomy.osu.edu/outreach/fosaa`

Public lecture series run by the OSU Astronomy Department. Talks are followed by lunch with community members and scientists.

Wisconsin Science Festival/Physics Fairs/Science Expeditions

Outreach events with scientific demos related to UW research aimed at parents and children

SYMPOSIUMS/SEMINARS/MEETINGS ORGANIZED

CCAPP Seminars 2024-2025

2024-2025 CCAPP lecture series

2022 CCAPP Fellows Symposium

Yearly event featuring talks by current CCAPP fellows

CCAPP Seminars 2021-2022

2021-2022 CCAPP lecture series

2020 IceCube Bootcamp (Virtual)

Workshop for new scientists working with the IceCube collaboration. Introduces basic scientific concepts and tools that are used in astroparticle research

STUDENTS SUPERVISED

I have supervised several students over the years, including a high school intern, a M.S. student, and multiple graduate students both at OSU and as part of the IceCube Collaboration Mentorship Program.

Yuca Chen (IceCube Mentee) 2024-Present

Jason Yao (OSU Grad Student) 2022-Present

Taylor Coakley (OSU Grad Student) 2022-Present

Payton Linton (OSU Grad Student) 2022-Present

Alan Salcedo-Gomez (OSU Grad Student) 2022-Present

Madison Jackson (OSU Grad Student, subsequently BlueHalo) 2022-2023

Ben Lorenz (WIPAC intern, now at UW-Milwaukee) 2020-2021

ADDITIONAL REFERENCES

Due to the interdisciplinary nature of my research program, additional references may be needed. Below is a list of people qualified to comment on various aspects of my research program. Primary references are bolded.

Atmospheric Science/Atmospheric Muography

- Jana Houser (Associate Professor at Ohio State): houser.262@osu.edu
- Joseph Chan (Assistant Professor at Ohio State): chan.1063@osu.edu
- Leigh Orf (Associate Scientist at University of Wisconsin): leigh.orf@wisc.edu

Astroparticle Physics

- John Beacom (Professor at Ohio State, Current Supervisor): beacom.7@osu.edu
- Albrecht Karle (Professor at University of Wisconsin, PhD Advisor): karle@icecube.wisc.edu
- Laura Manenti (Lecturer at University of Sydney): laura.manenti@sydney.edu.au
- Ali Kheirandish (Assistant Professor at University of Nevada, Las Vegas): ali.kheirandish@unlv.edu
- Justin Vandenbroucke (Professor at University of Wisconsin): vandenbrouck@wisc.edu
- Ignacio Taboada (Professor at Georgia Tech): itaboada@gatech.edu
- Amy Connolly (Professor at Ohio State): connolly@physics.osu.edu
- Jim Beatty (Professor at Ohio State): beatty.85@osu.edu