

# CONNER DAILEY

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## EDUCATION

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### Doctor of Philosophy in Physics

University of Waterloo, Resident of the Perimeter Institute

Advisors: Dr. Niayesh Afshordi and Dr. Erik Schnetter

August 2020 - Present

Expected Completion: December 2024

### Master of Science in Physics — University of Nevada, Reno

Advisor: Dr. Andrei Derevianko

Thesis Title: “Probing exotic fields with networks of atomic clocks”

August 2017 - December 2019

GPA: 3.845/4.000

### Bachelor of Science in Physics — University of Nevada, Reno

Advisor: Dr. Andrei Derevianko

Minors: Astronomy and Mathematics

August 2014 - May 2017

GPA: 3.827/4.000

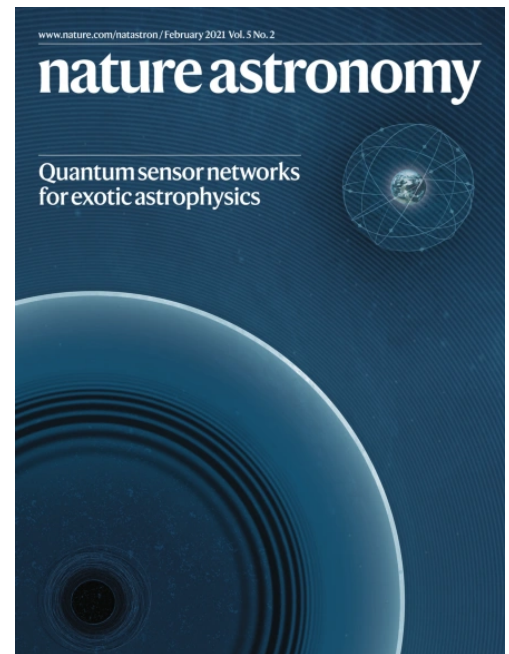
Physics GRE: 860

## PUBLICATIONS

Citations: 385 — h-index: 5 — i10-index: 5

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- **Conner Dailey**, Erik Schnetter, and Niayesh Afshordi.  
“Formulating the complete initial boundary value problem in numerical relativity to model black hole echoes” [Link](#).  
arXiv:2409.17970, 2024.
- **Conner Dailey**, Niayesh Afshordi, and Erik Schnetter.  
“Reflecting boundary conditions in numerical relativity as a model for black hole echoes” [Link](#).  
*Classical and Quantum Gravity*, 40(19):195007, 2023.
- **Conner Dailey**, Colin Bradley, Derek Kimball, Ibrahim Sulai, Szymon Pustelny, Arne Wickenbrock, and Andrei Derevianko.  
“Quantum sensor networks as exotic field telescopes for multi-messenger astronomy” [Link](#).  
*Nature Astronomy*, 5(2):150–158, 2020 (cover  $\rightarrow$ ).
- Yu Li, Ruolin Liu, **Conner Dailey**, and Niayesh Afshordi.  
“Detecting cosmological scalar fields using orbital networks of quantum sensors” [Link](#).  
*Phys. Rev. D*, 110:043028, 2024.
- Samer Afach, Ben Buchler, Dmitry Budker, **Conner Dailey**, Andrei Derevianko, et al. “Search for topological defect dark matter with a global network of optical magnetometers” [Link](#).  
*Nature Physics*, 17(12):13961401, 2021.
- Benjamin Roberts, Geoffrey Blewitt, **Conner Dailey**, and Andrei Derevianko. “Search for transient ultralight dark matter signatures with networks of precision measurement devices using a bayesian statistics method”. *Physical Review D*, 97(8), 2018 [Link](#).
- Benjamin Roberts, Geoffrey Blewitt, **Conner Dailey**, et al. “Search for domain wall dark matter with atomic clocks on board global positioning system satellites”. [Link](#).  
*Nature Communications*, 8(1), 2017
- S. Heck, A. Gatton, et al. “Symmetry breaking in the body-fixed electron emission pattern due to electron-retroaction in the photodissociation of  $\text{H}_2^+$  and  $\text{D}_2^+$  close to threshold” [Link](#).  
*Physical Review Research*, 1:033140, 2019.



## OTHER ACADEMIC PROGRAMS

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<b>Symmetries Graduate School 2023</b> Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada	January 2023 - February 2023 <a href="#">Link</a>
<b>PRISMA<sup>+</sup> Internship Program</b> Johannes Gutenberg University, Mainz, Germany	January 2020 - March 2020 <a href="#">Link</a>
<b>The 37<sup>th</sup> Advanced School in Theoretical Physics: New Ideas for Old Puzzles in Particle Physics</b> The Israel Institute of Advanced Studies, Jerusalem, Israel	December 2019 - January 2020 <a href="#">Link</a>

## FIRST-AUTHOR CONFERENCE PRESENTATIONS

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<b>Midwest Relativity Meeting</b> Ann Arbor, Michigan, USA Title: “Formulating the complete initial boundary value problem in numerical relativity to model black hole echoes” <a href="#">Link</a>	November 2024
<b>50 Years of Horndeski Gravity: Exploring Modified Gravity</b> Perimeter Institute, Ontario, Canada Title: “Formulating the complete initial boundary value problem in numerical relativity to model black hole echoes” <a href="#">Link</a>	July 2024
<b>Midwest Relativity Meeting</b> Chicago, Illinois, USA Title: “Reflecting boundary conditions in numerical relativity as a model for black hole echoes” <a href="#">Link</a>	November 2023
<b>Puzzles in the Quantum Gravity Landscape</b> Perimeter Institute, Ontario, Canada Title: “Reflecting boundary conditions in numerical relativity as a model for black hole echoes” <a href="#">Link</a>	October 2023
<b>Testing Gravity 2023</b> Vancouver, British Columbia, Canada Title: “Reflecting boundary conditions in numerical relativity as a model for black hole echoes” <a href="#">Link</a>	January 2023
<b>APS April Meeting 2019 “Quarks 2 Cosmos”</b> Session ID: L09.00006 — Denver, Colorado, USA Title: “Progress in dark matter search with the global positioning system” <a href="#">Link</a>	April 2019
<b>APS Division of Atomic and Molecular Physics Meeting 2018</b> Session ID: M01.00081 — Fort Lauderdale, Florida, USA Title: “Searching for dark matter and exotic physics with atomic clocks and the GPS constellation” <a href="#">Link</a>	June 2018
<b>PhysCon 2016</b> Session ID: S1 - 54 — San Francisco, California, USA Title: “Preliminary steps in detecting dark matter with the GPS satellite constellation” <a href="#">Link</a>	November 2016

## CO-AUTHOR CONFERENCE PRESENTATIONS

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- APS Division of Atomic, Molecular and Optical Physics Meeting 2024** June 2024  
Session ID: D00.00126 — Fort Worth, Texas, USA [Link](#)  
Title: “GPS.ELF: Update on the search for exotic low-mass field emission from the binary neutron star merger (GW170817) using GPS atomic clocks”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2023** June 2023  
Session ID: F01.00151 — Spokane, Washington, USA [Link](#)  
Title: “GPS.ELF: Search for exotic low-mass field emission from the binary neutron star merger (GW170817) using GPS atomic clocks”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2022** May 2022  
Session ID: E03.003 — Chicago, Illinois, USA [Link](#)  
Title: “GPS.ELF: Search for emission of exotic low-mass fields from the binary neutron star merger (GW170817) using GPS atomic clocks”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2020** June 2020  
Session ID: K01.00151 — Portland, Oregon, USA [Link](#)  
Title: “Search for Exotic Field Emission from the GW170817 Binary Neutron Star Merger Using GPS Atomic Clocks”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2019** May 2019  
Session ID: S01.00035 — Milwaukee, Wisconsin, USA [Link](#)  
Title: “Global Network of Clocks and Magnetometers as Exotic Light Field Telescopes”
- International Frequency Control Symposium** April 2019  
DOI: 10.1109/FCS.2019.8856056 — Orlando, Florida, USA [Link](#)  
Title: “DAMNED-DARK Matter from Non-Equal Delays New test of the fundamental constants variation”
- Rencontres de Moriond - 2019 Gravitation** March 2019  
ISBN: 9791096879106 — La Thuile, Valle d’Aosta, Italy [Link](#)  
Title: “The damned experiment: dark matter from non equal delays”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2018** June 2018  
Session ID: D06.00007 — Fort Lauderdale, Florida, USA [Link](#)  
Title: “New Precision Measurements from GPS. DM Observatory for Exotic Physics Searches: Atomic Clock Phases every Second to  $< 0.1$  ns”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2017** June 2017  
Session ID: J9.00005 — Sacramento, California, USA [Link](#)  
Title: “Searching for Dark Matter and Exotic Physics with Atomic Clocks and the GPS Constellation”
- APS Division of Atomic, Molecular and Optical Physics Meeting 2017** June 2017  
Session ID: Q1.00023 — Sacramento, California, USA [Link](#)  
Title: “Using Global Network Precision Measurements to Search for Exotic Physics”
- APS April Meeting 2017 “Quarks 2 Cosmos”** January 2017  
Session ID: C6.00002 — Washington D.C., USA [Link](#)  
Title: “First Results of the GPS.DM Observatory: Search for Dark Matter and Exotic Physics with Atomic Clocks and GPS Constellation”

## TEACHING EXPERIENCE

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### **Graduate Teaching Assistantships:**

ECE 105 - Classical Mechanics	August 2024 to Present
SCI 238 - Introduction to Astronomy	May 2024 to August 2024
SCI 238 - Introduction to Astronomy	January 2024 to May 2024
ECE 105 - Classical Mechanics	September 2023 to December 2023
PHYS 360/460 - Advanced Laboratory	January 2023 to May 2023
ECE 105 - Classical Mechanics	September 2022 to December 2022
SCI 238 - Introduction to Astronomy	May 2022 to September 2022
SCI 207 - Life, the Universe, and Everything	January 2022 to May 2022
ECE 105 - Classical Mechanics	September 2021 to December 2021
SCI 270 - Astronomical Observations	May 2021 to September 2021
SCI 238 - Introduction to Astronomy	January 2021 to May 2021
PHYS 181L - Physics for Scientists and Engineers II - Lab	September 2019 to December 2019
PHYS 152L - General Physics II - Lab	January 2018 to May 2018
PHYS 151L - General Physics I - Lab	August 2017 to December 2017

## PUBLIC OUTREACH

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**Kitchener/Waterloo Public Library, hour long public talk** September 2023  
Kitchener, Ontario, Canada  
Title: “Relativity: The secrets to visiting other galaxies and traveling in time.”

**Astronomy on Tap, hour long public talk** August 2023  
Kitchener, Ontario, Canada  
Title: “How black holes drag space and time along with them.”

## SCHOLARSHIPS

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**Authur B. McDonald HQP Pooled Re-  
sources Scholarship (HQP 2021-R7-01)**  
2022-2024

**International Doctoral Student Award**  
2020, 2021

**Marie Curie Graduate Award**  
2020

**Governor Guinn Millennium Scholarship**  
2014, 2015, 2016, 2017

**TMCC/UNR Thompson Scholarship**  
2014, 2015

**ASUN Academic Scholarship**  
2015, 2016

## HONORS AND AWARDS

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**Canadian Association of Physicists, Student  
Advisory Council Inaugural Problem Com-  
petition winner**  
2020

**UNR College of Science Dean's List**  
2015, 2016, 2017, 2018

**Nevada Undergraduate Research Award**  
2016

**2013 UNR Physics Exam Award**  
2013

**Silver Scholar Award**  
2009

## MEMBERSHIPS

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**Canadian Association of Physicists**  
**American Physical Society**  
**Society of Physics Students**  
**Sigma Pi Sigma**  
**National Society of High School Scholars**

## OTHER AWARDS

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**Eagle Scout** April 2014  
Boy Scouts of America

**Top 20 Participant and Top 10 Computer,  
600 Million Credit Contributor** 2017 - Present  
Einstein@Home, BOINC

**Top 50 Participant and Top 40 Computer,  
500 Million Credit Contributor** 2023 - Present  
GPUGRID, BOINC