

J. LUNA ZAGORAC

 [lunazagor](#)  [lunazagor](#)  [jlunazagorac](#)  [0000-0003-4504-1677](#)  lzagorac@pitp.ca

Postdoctoral Researcher ◊ Perimeter Institute ◊ Waterloo, ON N2L 2Y5

EMPLOYMENT

Perimeter Institute for Theoretical Physics, Waterloo, ON Postdoctoral Fellow	<i>Sep 2022 - Aug 2025</i>
Yale University, New Haven, CT Physics Researcher	<i>June 2022 - Aug 2022</i>

EDUCATION

Yale University, New Haven, CT Ph.D. in Physics	<i>Aug 2016 - May 2022</i>
Colgate University, Hamilton, NY B.A. with Honors in Astronomy/Physics & Anthropology	<i>Aug 2012 - May 2016</i>

SKILLS AND QUALIFICATIONS

Programming Languages	Python, C/C++, MATLAB, Chapel, Pascal
Python Packages	Jupyter, Matplotlib, Numba, NumPy, SciPy, PyFFTW, AstroPy
Software & Tools	LaTeX, Excel, Mathematica, ImageJ
Communication skills	Science & grant writing, outreach, public speaking, data visualization
Certifications	Yale Poorvu Center Certificate for Public Communication, Certificate of College Teaching Preparation
Languages	English & Serbian (native) French & Italian (proficient), Arabic (conversational) Latin & Middle/Late Egyptian (intermediate)

HONORS & AWARDS

Future Investigator in NASA Earth and Space Science and Technology <i>NASA Grant for \$90k funding two years of doctoral work and independent investigations of ULDM.</i>	<i>May 2020</i>
Leigh Page Award for Excellence in Graduate Student Teaching <i>Award for \$500 which recognizes broad and valuable contributions to physics education at Yale, science communication, and work fostering a welcoming learning environment for students.</i>	<i>Nov 2021</i>
Loyde and William C. G. Ortel Fellowship in Physics <i>Awarded to an outstanding student pursuing a Ph.D. in Physics.</i>	<i>Nov 2020</i>
Franke Science & Humanities Interdisciplinary Research Award <i>Yale Fellowship for \$3000 funding two years of interdisciplinary work on Egyptian constellations.</i>	<i>Sep 2019</i>
Colgate Physics and Astronomy Department Founders Award <i>Awarded periodically to a senior who has demonstrated four years of outstanding progress and development of their understanding of physics or astronomy.</i>	<i>Apr 2016</i>
Sigma Pi Sigma Physics Honors Society <i>Honorary membership to Sigma Pi Sigma Honors Society.</i>	<i>Apr 2016</i>
Alumni Memorial Scholar at Colgate University <i>Scholars are selected at the time of admission to Colgate for their dedication and interest in scholarship and have the opportunity to apply for grants totaling up to \$5,000 to fund independent research.</i>	<i>Aug 2012</i>

PUBLICATIONS

6. Robles, **Zagorac**, and Padmanabhan. “Scalar Field Dark Matter: Impact of Supernovae-driven blowouts in the central densities of dwarf galaxies.” *In prep, expected 2023*.
5. Gosenca, Eberhardt, Wang, Eggemeier, Kendall, **Zagorac**, and Easter. “Multifield Ultralight Dark Matter.” *arXiv: 2301.07114*
4. **Zagorac**, Kendall, Padmanabhan, and Easter. “Soliton Formation and the Core-Halo Mass Relation for Synthetic ULDM Halos: An Eigenstate Perspective.” *arXiv: 2212.09349*
3. **Zagorac**, Sands, Padmanabhan, and Easter. “Schrödinger-Poisson Solitons: Perturbation Theory.” (2021). *Physical Review D* 105, no. 10 (2022): 103506.
2. Padmanabhan, Ronaghan, **Zagorac**, and Easter. “Simulating Ultralight Dark Matter with Chapel: An Experience Report.” (2019). *2020 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*
1. **Zagorac**, Easter, and Padmanabhan. “GUT-scale primordial black holes: mergers and gravitational waves.” *Journal of Cosmology and Astroparticle Physics* 2019.06 (2019): 052.

PRESENTATIONS

† = Invited Speaker

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| 28. Testing Gravity 2023 | Jan 2023 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Simon Fraser University</i> |
| 28. † Cosmology Group Meeting | Oct 2022 |
| <i>A Light in the Dark: UltraLight Dark Matter Phenomenology in Simulations</i> | <i>Yale</i> |
| 28. † The Yale Summer Program in Astrophysics | Jul 2022 |
| <i>Comparing Cosmologies: the History of the Cosmos from Pyramids to Space Telescopes</i> | <i>Yale</i> |
| 27. 240th Meeting of the American Astronomical Society | Jun 2022 |
| <i>A Light in the Dark: UltraLight Dark Matter Phenomenology in Simulations</i> | <i>Virtual</i> |
| 26. Chapel Implementers and Users Workshop | Jun 2022 |
| <i>UltraLight Dark Matter in Simulations: A Chapel-Powered Eigenstate Perspective</i> | <i>Virtual</i> |
| 25. † Colgate University Physics & Astronomy Seminar | Apr 2022 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Colgate University</i> |
| 24. † Stockholm University | Jan 2022 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 23. † Perimeter Institute | Dec 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 22. † Stony Brook University | Nov 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 21. † University College London | Oct 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 20. † Carnegie Observatories | Oct 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 19. † University of Hawaii Institute of Astronomy | Oct 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |
| 18. † Northwestern University CIERA Science Happy Hour | Oct 2021 |
| <i>UltraLight Dark Matter Dynamics in the Language of Eigenstates</i> | <i>Virtual</i> |

17. **†Newcastle University Cosmology Journal Club** Sep 2021
Schrödinger-Poisson Solitons: Perturbation Theory. Virtual
16. **Weak Interaction Discussion Group at Yale** May 2021
Linear Approximations to UltraLight Dark Matter Stationary States Virtual
15. **American Research Center in Egypt Annual Meeting** Apr 2021
In Search of Lost Time: An Astronomical View of Ancient Egyptian Star Clocks Virtual
14. **Aspen Winter Conference, A Rainbow of Dark Sectors** Mar 2021
UltraLight Dark Matter & Its Eigenstates Virtual
13. **†Yale Institute of Sacred Music** Mar 2021
Cosmogonies, Cosmologies, & Time Virtual
12. **†Connecticut Digital Humanities** Feb 2021
In Search of Lost Time: An Astronomical View of Ancient Egyptian Star Clocks Virtual
11. **†Bay Area Science Festival Science Cafe Mini-Talks in Astronomy** Oct 2020
Cosmic Archaeology, or: How Do We Know the Things We Know? Virtual
10. **236th Meeting of the American Astronomical Society** Jun 2020
Parametrizing UltraLight Dark Matter Haloes Through Binary Soliton Core Mergers Virtual
9. **†Center for Computational Astrophysics** May 2020
Parametrizing UltraLight Dark Matter Haloes Through Binary Soliton Core Mergers Virtual
8. **Weak Interaction Discussion Group at Yale** May 2020
Parametrizing UltraLight Dark Matter Haloes Through Binary Soliton Core Mergers Virtual
7. **235th Meeting of the American Astronomical Society** Jan 2020
A Light in the Dark: Ultra Light Dark Matter in Theory and Simulation Hawaii Convention Center
6. **Great Lakes Cosmology Workshop** Aug 2019
Pseudo-Spectral Solvers for Fuzzy Dark Matter Rochester Institute of Technology
5. **Tri-Institute Summer School on Elementary Particles** Jul 2018
Gravitational Wave Spectrum of Ultralight Primordial Black Holes Perimeter Institute
4. **Colgate University Honors Thesis Defense** Apr 2016
Saving Tokyo: Constraining WIMPzilla Production in the Early Universe Colgate University
3. **Syracuse University Undergraduate Research Day** Dec 2015
Constraining WIMPzilla Production in the Early Universe Syracuse University
2. **Keck Northeastern Astronomy Consortium** Nov 2014
The Optical and Radio Variability of the Blazar 3C 454.3 Swarthmore College
1. **Colgate Physics & Astronomy Welcome Seminar** Sep 2014
The Variability of Blazar 3C 454.3 Colgate University

TEACHING EXPERIENCE

Certificate of College Teaching Preparation (CCTP)

May 2022

Yale Poorvu Center for Teaching and Learning

A record of participation in teaching activities and reflections on those experiences. Earning the CCTP, also meets requirements for the [Center for Integration of Research, Teaching and Learning](#) Associate.

Curriculum Development & Lecturing

Summer 2019 - 2021

Yale Bootcamp on Physics Fundamentals

Co-developed a curriculum for 20 hours of Classical Mechanics instruction, met weekly with staff supervisor to polish lectures and example problems. Delivered 10 hours of lecture at the Bootcamp. Developed a Mathematica tutorial for incoming graduate students. Re-vamped the curriculum and moved it online for Summer 2020 and Summer 2021.

Head Teaching Fellow Positions

Aug 2017 - May 2018

PHYS170/171 - University Physics for the Life Sciences

Organized other teaching fellows, staffed weekly help sessions and office hours, held review sessions on material before exams, graded weekly homework, proctored and graded exams.

Teaching Fellow Positions

S&DS176 - YData: Humanities Data Mining

Spring 2022

PHYS/ASTR600 - Cosmology

Fall 2020

PHYS442 - Introduction to Nuclear and Elementary Particle Physics

Spring 2020

PHYS410 - Classical Mechanics

Fall 2019

ASTR343 - Gravity, Astrophysics, and Cosmology

Spring 2019

PHYS165/166 - General Physics Laboratory

Fall 2016 - Spring 2017

SCIENCE COMMUNICATION

Public Communication Certificate

Oct 2021

Yale Poorvu Center for Teaching and Learning

Certification in public communication through extensive preparation for the 3MT Competition. Areas: Text, Speech, and Visual Design; Feedback and Revision; Peer and Interdisciplinary Collaboration.

Popular Science Presentations

David Dunlap Observatory Speaker's Night:

What we Can't See in the Universe (and Why it Might Be Fuzzy)

Dec 2022

Bay Area Science Festival "Astro Coffee": *Cosmic Archaeology*

Oct 2020

"Ask a Scientist" Webinar: *Dark Matter*

May 2020

"Astronomy on Tap": *Cosmic Archaeology*

Aug 2019

"3 Minute Thesis" Yale Finalist: *How Small Black Holes Teach Us about the Big Bang*

Apr 2019

Writing

Astrobites Media Intern at AAS238

Jun 2021

Astrobites Contributing Author (>15 [articles and interviews](#))

Dec 2019 - Dec 2021

ComSciCon at AIP Participant

Sep 2019

SERVICE & LEADERSHIP

University Positions

Yale Digital Humanities Lab Consultant	<i>Sep 2020 - May 2022</i>
McDougal Graduate Student Life Fellow at Yale	<i>Aug 2018 - May 2019</i>
Graduate Affiliate, Pauli Murray College at Yale	<i>Fall 2017 - Spring 2022</i>

Committee Work

Astrobites Diversity, Equity, and Inclusion Committee Member	<i>Mar 2020 - Dec 2021</i>
Physics Climate and Diversity Committee Member	<i>Jan 2018 - May 2020</i>

Conference & Seminar Organization

Co-organizer: Black in Physics Week at Yale Event Series	2020
Volunteer: Conference for Undergraduate Women in Physics	2019-2020
Co-organizer: Equity in the Job Search Symposium	2018-2019

Outreach Volunteering

Astronomy Ambassador, American Astronomical Society	<i>Jan 2020 - Present</i>
Volunteer, Yale Pathways to Science	<i>Fall 2018 - Spring 2019</i>
Activity Leader, CT Students Exploring Engineering Day	<i>Spring 2018</i>
Activity Leader, Girls Science Investigations	<i>Sep 2016 - Mar 2020</i>

MENTORSHIP

Undergraduates Researchers Supervised

Claire Recamier, junior at Yale: <i>Stellar Streams in UltraLight Dark Matter Halos</i>	<i>Jun 2021 - Present</i>
Isabel Sands, now Ph.D. student at Caltech: <i>Constructing a Binary Soliton Merger Library</i> <i>Linear Approximations to UltraLight Dark Matter Stationary States</i>	<i>Jan 2020 - Jun 2021</i>

Formalized Mentoring Activities

SU(5) Group Mentor	<i>Fall 2020</i>
Científico Latino Graduate Student Mentoring Initiative (GSMI) Mentor	<i>Fall 2019</i>
Women in Science at Yale (WISAY) Mentor	<i>2016-2019</i>