

# Milena CRNOGORČEVIĆ

## PhD | Astrophysics

Pronouns: she/her/hers

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Identifiers: [0000-0002-7604-1779](https://orcid.org/0000-0002-7604-1779), [INSPIRE HEP: M.Crnogorcevic.1](https://inspirehep.net/literature/1584441), [NASA/ADS](https://arxiv.org/a/crnogorcevic_1)

## 🔍 RESEARCH INTERESTS

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- > Axion-like particles in high-energy astrophysical environments: observational signatures and indirect searches
- >  $\gamma$ -ray instrumentation: sensitivity to indirect dark matter searches with the current and future instruments
- > Precursor emission in gamma-ray bursts
- > Multimessenger astronomy: searches for coincident electromagnetic and gravitational-wave or astrophysical neutrino emission to understand the origin and relevant production mechanisms

## 📅 PROFESSIONAL APPOINTMENTS

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August 2023  
now Postdoctoral Fellow at the Oskar Klein Centre for Cosmoparticle Physics, Stockholm University,  
Advisor: Prof. Timothy Linden

## 🎓 EDUCATION

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- 2023 **Doctor of Philosophy, University of Maryland**, Department of Astronomy
  - > Thesis Title: *New Messengers & New Physics: A Survey of the High-energy Universe*
- 2019 **Master of Science, University of Maryland**, Department of Astronomy
  - > Thesis Title: *Axion-like Particles and Where to Find Them: Searching for ALP-induced Core-collapse Supernovae with Fermi*
- 2017 **Bachelor of Arts, Middlebury College**, major in physics and minor in mathematics
  - > Honors Thesis: *Probing into quasar/galaxy co-evolution using the OSIRIS data*
  - > *magna cum laude* with high honors
- 2013 Bi-lingual International Baccalaureate Diploma, Li Po Chun United World College of Hong Kong

## 📁 RESEARCH EXPERIENCE

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- April 2018 NASA Goddard Space Flight Center,  
July 2023 Graduate Research Assistant. Advisor: Dr. R. Caputo
  - > Member of the *Fermi*-LAT Collaboration. Affiliated with the *Fermi*-GBM and *Swift*-BAT Teams.
- September 2016 Department of Physics, Middlebury College,  
May 2017 Undergraduate Research Assistant. Advisor: Prof. E. Glikman, *honors thesis*
  - > Investigating the co-evolution of post-merger galaxies and dust-redenned quasars using integral-field spectrography.
- May 2016 Department of Physics, Middlebury College,  
August 2016 Undergraduate Research Assistant. Advisor: Prof. N. Graham
  - > Computing edge-correction coefficients to the proximity force approximation for the Casimir energy of an oblate spheroid facing a plane.
- May 2015 Department of Physics, Middlebury College,  
August 2015 Undergraduate Research Assistant. Advisor: Prof. E. Glikman
  - > Spectral analysis of red and obscured quasars in SDSS Stripe 82.

- 2024 [HEAD Dissertation Prize Finalist \(\\$1.5k\)](#)
- 2022 [Fermi GI Program Cycle 15: Principal Investigator \(\\$50k\)](#)  
*Light at the end of the Tunnel: Search for ALP dark matter in precursor emission of long GRBs*
- 2022 [Andrew S. Wilson Prize](#) for Excellence in Research, Department of Astronomy, University of Maryland
- 2022 [Department Service Award](#), Department of Astronomy, University of Maryland  
*Honoring exceptional contributions to the department through service.*
- 2022 [Best Poster Award: The High Energy Astrophysics Division \(HEAD\)](#), 19th Divisional Meeting of HEAD
- 2022 [Outstanding Graduate Research Assistant Award](#), University of Maryland  
*Recognized as among the top 2% Graduate Assistants in a given year at the University of Maryland.*
- 2021 [Award for the best talk promotion video](#), Kashiwa Dark Matter Symposium
- 2021 [Price Prize nomination](#), Center for Cosmology and Astroparticle Physics at The Ohio State University
- 2020 [John Mather Nobel Scholar \(\\$3k\)](#)
- 2019–20 [College of Computer, Mathematical, and Natural Sciences Dean's Fellowship \(\\$5k\)](#)
- 2017–18 [Graduate School Dean's Fellowship \(\\$10k\)](#)
- 2013–17 [Davis UWC Scholar \(\\$20k per annum\)](#)
- 2011–13 [Li Po Chun UWC, full merit-based scholarship \(\\$30k per annum\)](#)
- 2009 [Junior Balkan Mathematical Olympiad, bronze medal](#)

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 PUBLICATION LIST

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## First and second author:

4. [M. Crnogorčević](#) and Timothy Linden (*accepted for publication in PRD.*)  
*Strong Constraints on Dark Matter Annihilation in Ursa Major III/UNIONS 1*
3. C. Fletcher et. al *on behalf of the Fermi-GBM Team*; [M. Crnogorčević](#) et al. *on behalf of the Swift-BAT*, and the LVK Collaboration, (*accepted for publication in ApJ.*)  
*A Joint Fermi-GBM and Swift-BAT Analysis of Gravitational-Wave Candidates from the Third Gravitational-wave Observing Run*
2. M. Negro, [M. Crnogorčević](#), E. Burns, E. Charles, L. Marcotulli, and R. Caputo, 2023, 2023 ApJ **951** 83  
*Search for spatial correlation between IceCube neutrino events and the Fermi-LAT unresolved gamma-ray sky*
1. [M. Crnogorčević](#), R. Caputo, M. Meyer, N. Omodei, and M. Gustafsson, 2021, Phys. Rev. D., 104, 103001  
*Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT's Low Energy Technique*

## N-th author:

11. S. Lesage and 139 co-authors, incl. [M. Crnogorčević](#), 2023, ApJL **952** L42  
*Fermi-GBM Discovery of GRB 221009A: An Extraordinarily Bright GRB from Onset to Afterglow*
10. D. Smith and 159 co-authors, incl. [M. Crnogorčević](#), 2023, accepted by ApJS  
*The Third Fermi Large Area Telescope Catalog of Gamma-ray Pulsars*
9. S. Abdollahi and 112 co-authors, incl. [M. Crnogorčević](#), 2023, 2023 ApJS **265** 31  
*The Fermi-LAT Lightcurve Repository*
8. M. Ajello and 100 co-authors, incl. [M. Crnogorčević](#), 2022, ApJS **263** 24  
*The Fourth Catalog of Active Galactic Nuclei Detected by the Fermi Large Area Telescope—Data Release 3*
7. S. Abdollahi and 118 co-authors, incl. [M. Crnogorčević](#), 2022, ApJ, 933, 204  
*Search for New Cosmic-Ray Acceleration Sites within the 4FGL Catalog Galactic Plane Sources*
6. Y. Liu and 132 co-authors, incl. [M. Crnogorčević](#), 2022, Science, 376, 521-523  
*A gamma-ray pulsar timing array constrains the nanohertz gravitational wave background*
5. S. Abdollahi and 139 co-authors, incl. [M. Crnogorčević](#), 2022, ApJS, 260, 53  
*Incremental Fermi Large Area Telescope Fourth Source Catalog*
4. I. Mereu and 114 co-authors, incl. [M. Crnogorčević](#), 2021, ApJS, 256, 13  
*Catalog of Long-Term Transient Sources in the First 10 Years of Fermi-LAT Data*
3. M. Ajello and 108 co-authors, incl. [M. Crnogorčević](#), 2021, Nature Astronomy, 5, 385-391  
*High-energy emission from a magnetar giant flare in the Sculptor galaxy*

2. M. Ajello and 123 co-authors, incl. **M. Crnogorčević**, 2019, ApJ, 878, 52  
*A Decade of Gamma-Ray Bursts Observed by Fermi-LAT: The Second GRB Catalog*
1. E. Glikman and 13 co-authors incl. **M. Crnogorčević**, 2018, ApJ, 861, 37  
*Luminous WISE-selected Obscured, Unobscured, and Red Quasars in Stripe 82*

#### White papers:

1. R. Caputo et al. incl. **M. Crnogorčević**, Snowmass2021 Letter of Interest  
*Light Dark Matter Candidates with MeV gamma-ray signatures*

A full list of publications, including 14 GCN notices (real-time notices in the transient community), can be found at the [ADS website](#).

## INVITED TALKS

### Research:

- > “WISPs, WIMPs, and Gammas: Searches for New Physics with the Fermi Large Area Telescope,” *COSMIC WISPerS Colloquium*, online (April, 2024)<sup>1</sup>
- > *Title TBD*, Sydney Consortium for Particle Physics and Cosmology (Sydney-CPPC) seminar, online (May, 2024)
- > “Astrophysical Probes of Dark Matter: Past, Present, and Future of Gamma-ray Observations” plenary talk at the [Dark Matter Beyond the Weak Scale II workshop](#), Durham University, UK (March, 2024)
- > “New Messengers & New Physics: A Survey of the High-energy Universe” oral presentation at the 21st Divisional Meeting of HEAD as a Dissertation Award Finalist, Horseshoe Bay, TX (April, 2024)
- > “Beyond the Visible: New Messengers and New Physics,” oral presentation at the Center for Neutrino Physics Seminar, Virginia Tech, Blacksburg, VA (April, 2023)
- > “Beyond the Visible: New Messengers and New Physics,” oral presentation at SED Director’s Seminar, NASA Goddard Space Flight Center, Greenbelt, MD (February, 2023)
- > “Light at the End of the Tunnel: Searching for Axion-like Particles in Gamma-ray Energies,” oral presentation at the HEP Seminar, Columbia University, New York City, NY (December, 2022)
- > “Light at the End of the Tunnel: Searching for Axion-like Particles in Gamma-ray Energies,” oral presentation at the SLAC Theory Group Seminar, Stanford University, Stanford, CA (October, 2022)
- > “New Physics through a Multimessenger Lens: an Exploration of the High-energy Universe,” oral presentation at the CCAPP Seminar Series, The Ohio State University, Columbus, OH (September, 2022)
- > “Astrophysical searches for axion-like particles in gamma-ray energies & multimessenger studies of the high-energy Universe,” oral presentation at the Department of Physics/WIPAC Seminar Series, University of Wisconsin, Madison, WI (September, 2022)
- > “Catching the next wave: Searching for gamma-ray counterparts to gravitational-wave events with Fermi-GBM and Swift-BAT,” oral presentation at the NASA Marshall Space Flight Center & University of Alabama, Huntsville, AL (July, 2022)
- > “Astrophysical searches for axion-like particles in gamma-ray energies & multimessenger studies of the high-energy Universe,” oral presentation at the THEAPA seminar, IoA, Cambridge, UK (June, 2022)
- > “Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT’s Low Energy Technique,” oral presentation at the CCAPP Seminar Series, The Ohio State University, Columbus, OH (November, 2021)
- > “Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT’s Low Energy Technique,” oral presentation at the NASA Astroparticle Physics Lab Seminar Series, Greenbelt, MD (August, 2021)

### Equity, Diversity, Inclusion, and Accessibility:

- > “DEI Work in Science Positions,” panelist at the special DEIA-themed Weekly Analysis Meeting, *Fermi-LAT Collaboration*; online (September, 2023)
- > “*Fermi* Mentoring Program: lessons learned from near and far,” oral presentation at the Community Round Table, Department of Physics, Columbia University, New York City, NY (December, 2022)
- > “Picture a Scientist,” panelist at the ICRC 2021 Diversity session, online (July, 2021)
- > “Equity, Diversity, and Inclusion Initiatives at the University of Maryland Astronomy Department,” Multimessenger Diversity Network seminar, online (October, 2020)

## CONTRIBUTED TALKS

- > “New physics through a multimessenger lens: searching for axion-like particles from transient astrophysical events,” oral presentation at TeVPA; Naples, Italy (September, 2023)
- > “New physics through a multimessenger lens: searching for axion-like particles from transient astrophysical events,” dissertation presentation at 241 AAS Meeting; Seattle, WA (January, 2023)
- > “Searching for Axionlike Particles from Gamma-ray Bursts with Fermi,” oral presentation at TeVPA; Kingston, Canada (August, 2022)

<sup>1</sup>Future talks noted in italic

- > “Searching for Gamma- and hard X-ray Counterparts to Gravitational-wave events in GWTC-3 with Fermi-GBM and Swift-BAT,” oral presentation at TeVPA; Kingston, Canada (August, 2022)
- > “Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT’s Low Energy Technique,” oral presentation at the APS April Meeting; New York City, NY (April, 2022)
- > “Searching for Gamma- and X-ray Counterparts to Gravitational-wave events with Fermi-GBM and Swift-BAT,” poster presentation at the APS April Meeting; New York City, NY (April, 2022)
- > “Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT’s Low Energy Technique,” poster presentation at the 19th HEAD Meeting; Pittsburgh, PA (March, 2022)
- > “Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT’s Low Energy Technique,” oral presentation at Kashiwa Dark Matter Symposium; online (November, 2021)
- > “Axion-like Particles from Core-collapse Supernovae: Investigating Fermi’s Sensitivity,” poster presentation at A Rainbow of Dark Sectors, Aspen Center for Physics; online (March, 2021)
- > “Axion-like Particles from Core-collapse Supernovae: Investigating Fermi’s Sensitivity,” oral presentation at the virtual *Fermi* Collaboration Meeting; online (March, 2020)
- > “ALP-induced Core-collapse Supernovae,” oral presentation at *Fermi* Collaboration Meeting, Santa Cruz, CA (September, 2019)
- > “Axion-like Particles and Where to Find Them,” oral presentation at *Fermi* Summer School, Lewes, DE (June, 2018)
- > “Quasar/Galaxy Co-evolution with OSIRIS,” oral presentation at Undergraduate Spring Research Symposium, Middlebury College; Middlebury, VT (April, 2017)
- > “Quasar/Galaxy Co-evolution with OSIRIS,” oral presentation at APS Conference for Undergraduate Women in Physics, Harvard University; Cambridge, MA (January, 2017)
- > “Edge Expansion of Scalar Casimir Energies,” poster presentation at Undergraduate Summer Research Symposium, Middlebury College; Middlebury, VT (August, 2016)
- > “New Selection Criteria for Red and Obscured Quasars in Stripe 82,” poster presentation at APS Conference for Undergraduate Women in Physics, Syracuse University; Syracuse, NY (January, 2016)
- > “New Selection Criteria for Red and Obscured Quasars in Stripe 82,” presentation at Keck Northeast Astronomy Consortium Undergraduate Symposium on Research in Astronomy, Williams College; Williamstown, MA (October, 2015)

## TEACHING EXPERIENCE

**Teaching Assistant for Introductory Astronomy**, College Park, MD 2017–2018  
*Astronomical observations and history of astronomy, Solar system, stellar evolution, galaxy morphology and evolution, cosmology* • Instructors: Prof. Suvi Gezari (Fall 2017), Prof. Alberto Bolatto (Spring 2018)

**Astronomy Outreach & Telescope Operator**, Middlebury, VT 2015–2017  
*Conducting observatory events and operating telescopes at the Mittelman Observatory* • Advisor: Jonathan Kemp

**Tutor at the Center for Teaching, Learning, and Research**, Middlebury, VT 2014–2017  
*Newtonian Physics, Electricity and Magnetism*

**Teaching Assistant for Applied Mathematics to Physical Sciences**, Middlebury, VT 2016  
*Complex numbers and functions, sequences and series, ODE’s, Fourier analysis, multi-variable calculus, special functions, and vector calculus* • Instructor: Prof. Stephen J. Ratcliff

**Laboratory Assistant for Newtonian Physics**, Middlebury, VT 2015  
*Demonstrating techniques and instruments used in the experiments pertaining to classical mechanics: inertia, force, Newton’s laws of motion, work and energy, linear momentum, collisions, gravitation, rotational motion, torque, angular momentum, and oscillatory motion* • Instructor: Prof. Richard Wolfson

**Teaching Assistant for Electricity and Magnetism**, Middlebury, VT 2014–2015  
*Practical topics from electricity and magnetism, voltage, current, resistance, capacitance, inductance, and AC and DC circuits* • Instructor: Prof. Noah Graham

**Teaching Assistant for Newtonian Physics**, Middlebury, VT 2014  
*Introductory level classical mechanics* • Instructor: Prof. Anne Goodsell

## SERVICE & OUTREACH

- > Co-chair of Future Innovations in Gamma rays Science Analysis Group, **FIG SAG** 2023–now
- > Journal reviewer for Physical Review Letters, Physical Review D, Journal of Cosmology and Astroparticle Physics 2022–now

- > Science coordinator of Dark Matter & New Physics working group, *Fermi*-LAT 2022–2023
- > Mentoring Program founder & organizer, *Fermi*-LAT/GBM Collaborations 2020–2023
- > DEI Committee Member, *Fermi*-LAT 2020–2023
- > Gamma-ray Burst Advocate, ~10 week-long shifts/year, *Fermi*-LAT 2018–2023
- > GRAD-MAP Team co-lead, University of Maryland 2019–2022
- > BANG! Seminar lead organizer, University of Maryland 2019–2021
- > EDI Committee member, Department of Astronomy, University of Maryland 2017–2021
- > *Fermi*-LAT Reddit Ask Me Anything August 2020
- > ACE (formerly known as AGN) mentor to undergraduate students, University of Maryland 2018–2019
- > Equity Constellation, The Access Network member, University of Maryland 2017–2018
- > Women in Physics luncheon co-founder, Middlebury College 2016–2017

I served on a number of short-term initiatives, including but not limited to conducting graduate student interviews, participating in faculty searches, organizing the UMD Astronomy peer mentoring program, organizing and participating in a number of panels (e.g. applying to graduate school, GSFC/UMD connection, etc.), organizing visits to GSFC for prospective students, acting as a point person for the Department of Astronomy Mental Health Survey, organizing virtual check-in spaces during the Covid-19 pandemic, etc.

## IN THE NEWS

- > Brightest-Ever Space Explosion Reveals Possible Hints of Dark Matter, *Quanta Science Podcast*, March 2023
- > Brightest ever space explosion could help explain dark matter, *Quanta Magazine*, October 2022
- > Early-career Scientist Spotlight at NASA Goddard: Milena Crnogorčević, June 2022

## SUMMER SCHOOLS, WORKSHOPS, AND COMPETITIONS

- > Summer School in Astrostatistics and Astroinformatics, Center for Astrostatistics at the Pennsylvania State University (June, 2022)
- > SSI 2020 “The Almost Invisibles: Exploring the Weakly Coupled Universe,” SLAC Summer Institute (August 2020)
- > *Fermi* Summer School, Lewes, DE (June, 2018)
- > The Access Network Assembly, Denver, CO (May, 2018)
- > Four-time participant of the Mathematics Program at the Petnica Scientific Center, Petnica, Serbia (2010)
- > Member of the Montenegrin National Team and a two-time participant of the Junior Balkan Mathematical Olympiad (JMBO)

## COMPUTING SKILLS

**Programming** Highly proficient in MATLAB, Python, XSPEC, *GtBurst*, Wolfram Mathematica,  $\LaTeX$ ; proficient in PyRAF, IDL, Adobe Illustrator, TOPCAT, DS9; beginner in Bash, C, Git, HTML/CSS.

**Operating Systems** macOS, Linux, Windows

## GENERAL INFORMATION

**MEMBERSHIP:** American Astronomical Society (AAS), American Physical Society (APS)

**LANGUAGES:** Serbian (native), English (bilingual proficiency), Italian (professional working proficiency), Spanish (elementary proficiency)

**HOBBIES:** Swimming (2022 US Masters Swimming (USMS) National Champion in 200 m breaststroke, 6-time USMS medalist (2022), 9-time USMS Top Ten fastest times in the U.S.), volleyball (member of the department team *Dirty Snowballs*), spoken-word poetry, creative writing, chess, fencing, crossword puzzles.

## REFERENCES

### Dr. Regina Caputo (overall)

Research Astrophysicist  
NASA GODDARD SPACE FLIGHT CENTER  
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### Dr. Manuel Meyer (research)

Research Group Leader  
UNIVERSITY OF HAMBURG  
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### Dr. Massimo Ricotti (research)

Professor  
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### Dr. Stuart Vogel (outreach)

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### Dr. Coleman Miller (research)

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### Dr. Christopher Reynolds (research)

Plumian Professor  
UNIVERSITY OF CAMBRIDGE  
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