Milena CRNOGORČEVIĆ

PhD Candidate | Astronomy

Pronouns: she/her/hers
@ mcrnogor@umd.edu
ATL 1259 University of Maryland, College Park, MD 20742
mcrnogor.github.io milena-crnogorčević
Identifiers: 0000-0002-7604-1779, INSPIRE HEP: M.Crnogorcevic.1, NASA/ADS

Research Interests

- Axion-like particles in high-energy astrophysical environments: observational signatures and indirect searches
- γ-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

Education

exp. April 2023 **Doctor of Philosophy, University of Maryland**, Department of Astronomy
- Thesis Title: *New Messengers & New Physics: A Survey of the High-energy Universe*
- Thesis Committee: *Dr. R. Caputo (NASA/GSFC)*[1], Prof. M. Meyer (Univ. of Hamburg), Prof. M. Ricotti (Univ. of Maryland), Prof. C. Miller (Univ. of Maryland), Prof. C. Reynolds (Univ. of Cambridge)

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

April 2018 – now **University of Maryland & NASA Goddard Space Flight Center,**
Research Assistant to Dr. R. Caputo
- Member of the *Fermi*-LAT Collaboration. Affiliated with the *Fermi*-GBM and *Swift*-BAT Teams.

September 2016 – May 2017 **Department of Physics, Middlebury College,**
Research Assistant to Prof. E. Glikman, *honors thesis*
- Investigating the co-evolution of post-merger galaxies and dust-redenned quasars using integral-field spectrography.

May 2016 – August 2016 **Department of Physics, Middlebury College,**
Research Assistant to 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 – August 2015 **Department of Physics, Middlebury College,**
Research Assistant to Prof. E. Glikman
- Spectral analysis of red and obscured quasars in SDSS Stripe 82.

[1] Primary advisor noted in italic

Grants, Honors, & Awards

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 Excelence in Research, Department of Astronomy, University of Mayland
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**

Publications

First and second author:

3. C. Fletcher et. al *on behalf of the Fermi-GBM Team*; **M. Crnogorčević** et al. *on behalf of the Swift-BAT Team*, and the LVK Collaboration, *(under LVK Collaboration review)*
*A Joint Fermi-GBM and Swift-BAT Analysis of Gravitational-Wave Events from the GWTC-3 Catalog**[2]
2. M. Negro, **M. Crnogorčević**, E. Burns, E. Charles, K. Feng, and R. Caputo, *(under Fermi Collaboration review)*
*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**

Currently working on:

2. **M. Crnogorčević**, M. Meyer, N. Omodei, and R. Caputo, in prep. (to be submitted in <2 months)
Long-GRB precursor emission: a comprehensive search for ALP signatures during precursor activity with Fermi-LAT Low Energy Technique
1. **M. Crnogorčević**, M. Meyer, and R. Caputo, in prep. (to be submitted in <6 months)
Constraining Axion-like Particle properties with the Fermi Large Area Telescope observations of the near-by Gamma-ray Bursts

N-th author:

8. M. Ajello and 100 co-authors, incl. **M. Crnogorčević**, 2022, [arXiv:2209.12070]
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

[2] An asterisk indicates a significant contribution

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

- "*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)
- "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)
- "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," Dissertation Contributed Presentation at 241 AAS Meeting, Seattle, WA (January, 2023)
- "Searching for Axionlike Particles from Gamma-ray Bursts with Fermi," oral presentation at the TeVPA Meeting (August, 2022)
- "Searching for Gamma- and hard X-ray Counterparts to Gravitational-wave events in GWTC-3 with Fermi-GBM and Swift-BAT," oral presentation at the TeVPA Meeting (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 (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 (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 (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 (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 (March, 2021)
- "Axion-like Particles from Core-collapse Supernovae: Investigating Fermi's Sensitivity," oral presentation at the virtual *Fermi* Collaboration Meeting (March, 2020)
- "ALP-induced Core-collapse Supernovae," oral presentation at *Fermi* Colaboration 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 (April, 2017)
- "Quasar/Galaxy Co-evolution with OSIRIS," oral presentation at APS Conference for Undergraduate Women in Physics, Harvard University (January, 2017)
- "Edge Expansion of Scalar Casimir Energies," poster presentation at Undergraduate Summer Research Symposium, Middlebury College (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 (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 (October, 2015)
- "New Selection Criteria for Red and Obscured Quasars in Stripe 82," Keck Northeast Astronomy Consortium Undergraduate Research in Astronomy Journal (October, 2015)
- "Hilbert's Theorem 90," oral presentation at the IX Conference of Scientific Research Center Petnica, Belgrade (September, 2010)

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

In the News

- Brighest ever space explosion could help explain dark matter, *Quanta Magazine*, October 2022
- Early-career Scientist Spotlight at NASA Goddard: Milena Crnogorčević, June 2022

Service & Outreach

- **Science coordinator of Dark Matter & New Physics working group**, *Fermi*-LAT 2022–now
- **Journal reviewer for Physical Review Letters and Physical Review D** 2022–now
- Mentoring Program founder & organizer, *Fermi*-LAT/GBM Collaborations 2020–now
- **DEI Committee Member**, *Fermi*-LAT 2020–now
- **Gamma-ray Burst Advocate**, ∼10 week-long shifts/year, *Fermi*-LAT 2018–now
- 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.

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)

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
regina.caputo at nasa dot gov

Dr. Manuel Meyer (research)
Research Group Leader
University of Hamburg
manuel.meyer at desy dot de

Dr. Massimo Ricotti (research)
Professor
University of Maryland
ricotti at umd dot edu

Dr. Stuart Vogel (outreach)
Professor
University of Maryland
svogel at umd dot edu

Dr. Coleman Miller (research)
Professor
University of Maryland
mcmiller at umd dot edu

Dr. Christopher Reynolds (research)
Plumian Professor
University of Cambridge
csr12 at cam dot ac dot uk

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