# Milena Crnogorčević

PhD Candidate, Astronomy
ATL 1241 University of Maryland, College Park, MD 20742
mcrnogor@astro.umd.edu— mcrnogor.github.io


## Research Interests

- Axion-like particles from core-collapse supernovae: 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

## Education

**Doctor of Philosophy, University of Maryland**, College Park, MD — exp. January 2023
Department of Astronomy
Thesis: *Astrophysical Searches for Axion-like Particles in $\gamma$-ray Energies and Multimessenger Studies of the High-energy Universe*
Thesis Committee: *Dr. Regina Caputo (NASA/GSFC)*[†], Dr. Manuel Meyer (Erlangen Center for Astroparticle Physics), Prof. Massimo Ricotti (Univ. of Maryland), Prof. Coleman Miller (Univ. of Maryland), Prof. Christopher Reynolds (Univ. of Cambridge)

**Master of Science, University of Maryland**, College Park, MD — December 2019
Department of Astronomy
Thesis: *Axion-like Particles and Where to Find Them: Searching for ALP-induced Core-collapse Supernovae with Fermi*
Advisors: *Dr. Regina Caputo (NASA/GSFC)*, Dr. Manuel Meyer (Stanford University/KIPAC), Prof. Massimo Ricotti (Univ. of Maryland)

**Bachelor of Arts, Middlebury College**, Middlebury, VT — May 2017
Major: Physics, with a minor in Mathematics, *magna cum laude* with high honors
Honors Thesis: Probing into the quasar/galaxy co-evolution using the OSIRIS data
Advisor: *Prof. Eilat Glikman*

**Li Po Chun United World College**, Hong Kong — May 2013
Bi-lingual International Baccalaureate Diploma

## Honors and Awards

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| Price Prize, Center for Cosmology and Astroparticle Physics at Ohio State University, *nomination* | 2021 |
| Graduate Student Distinguished Service Award, *nomination* | 2021 |
| John Mather Nobel Scholar ($3k) | 2020 |
| College of Computer, Mathematical, and Natural Sciences Dean's Fellowship ($5k) | 2019–20 |
| Graduate School Dean's Fellowship ($10k) | 2017–18 |
| Davis UWC Scholar ($20k per annum) | 2013–17 |
| Li Po Chun UWC, full merit-based scholarship ($30k per annum) | 2011–13 |
| Junior Balkan Mathematical Olympiad, bronze medal | 2009 |

## Research Experience

**Department of Astronomy, University of Maryland & NASA Goddard Space Flight Center** — 2018–

[†]Primary advisor noted in italic

Research Assistant to Dr. Regina Caputo
Member of the *Fermi* Dark Matter & New Physics and Gamma-ray Burst Group. *Fermi*-LAT Burst Advocate

**Department of Physics, Middlebury College** 2016–2017
Research Assistant to Prof. Eilat Glikman; Honors Thesis

**Department of Physics, Middlebury College** Summer 2016
Research Assistant to Prof. Noah Graham
*Computing edge-correction coefficients to the proximity force approximation for the Casimir energy of an oblate spheroid facing a plane*

**Department of Physics, Middlebury College** Summer 2015
Research Assistant to Prof. Eilat Glikman
*Analyzing new selection criteria for red and obscured quasars in SDSS Stripe 82*

## Work and 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

## Publications

[7] **M. Crnogorčević** and R. Caputo, *on behalf of the Swift-BAT*, and C. Fletcher, J. Wood, and R. Hamburg, *on behalf of the Fermi-GBM*, in prep. (to be submitted in Sept. 2021)
*Fermi-GBM and Swift-BAT sub-threshold searches coincident with LIGO/Virgo/Kagra O3 catalog events*

[6] M. Negro, **M. Crnogorčević**, E. Burns, E. Charles, K. Feng, and R. Caputo, in prep. (to be submitted in $< 3$ months)

*Search for spatial correlation between IceCube neutrino events and the Fermi-LAT unresolved gamma-ray sky*

[5] **M. Crnogorčević**, R. Caputo, M. Meyer, N. Omodei, and M. Gustafsson, accepted Phys. Rev. D.
*Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT's Low Energy Technique,*,
preprint.

[4] I. Mereu, S. Cutini, E. Cavazzuti, G. Tosti and 111 co-authors, incl. **M. Crnogorčević**, 2021, ApJS.
*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
*High-energy emission from a magnetar giant flare in the Sculptor galaxy*

[2] M. Ajello and 123 co-authors, incl. **M. Crnogorčević**, 2019, ApJ.
*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.
*Luminous WISE-selected Obscured, Unobscured, and Red Quasars in Stripe 82*

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

**Talks**

- *"Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT's Low Energy Technique," oral presentation at the 239th AAS Meeting (January, 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)*
- *[invited talk] "Searching for Axion-like Particles from Core-Collapse Supernovae with Fermi LAT's Low Energy Technique," oral presentation at the CCAPP Seminar Series (November, 2021)*
- Invited panelist to *"Picture a Scientist"* ICRC 2021 Diversity session (July, 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* Colaboration Meeting (March, 2020)
- "Axion-like Particles from Core-collapse Supernovae: Investigating Fermi's Sensitivity," poster presentation at UCLA Dark Matter 2020, Los Angeles, CA (March, 2020)—*canceled due to the COVID-19 outbreak.*
- "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)

[†]Expected talks noted in italic

- "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," publication in "Petničke sveske" and a presentation at the IX Conference of Scientific Research Center Petnica, Belgrade (September, 2010)

## Outreach

- *Fermi*-LAT DEI Committee Member (February 2020– ); *Fermi*-LAT Mentoring Program organizer (August 2020– );
- GRAD-MAP team co-lead, University of Maryland (September 2019– ); Member (September 2017– )
- BANG! Seminar Organizing Committee coordinator, University of Maryland (June 2019–2021)
- EDI Committee member, University of Maryland. (September 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 (2017–2018)
- Women in Physics, luncheon co-founder, Middlebury College (2016–2017)

## Summer Schools, Workshops, and Competitions

- SSI 2020 - SLAC Summer Institute 2020: "The Almost Invisibles: Exploring the Weakly Coupled Universe," Online ZOOM video-conference (August 2020)
- ISAPP School 2020: "Gamma rays to shed light on dark matter," Madrid, Spain (June 2020, *postponed due to the COVID-19 outbreak*)
- *Fermi* Summer School, Lewes, DE (June, 2018)
- The Access Network Assembly, Denver, CO (May, 2018)
- Four-time participant of the Mathematics Program at 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

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

## Membership

American Astronomical Society (AAS), American Physical Society (APS)

## General Information

Languages: Serbian (native), English (fluent), Italian (intermediate)
Pronouns: she/her/hers

**Hobbies:** US Masters Swimming (6 USMS Top Ten achievements in 2019 and 2020), IM Volleyball player (member of the departmental team *Dirty Snowballs*), spoken-word poetry, creative writing, chess, fencing, crossword puzzles.

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*Curriculum Vitae last time updated on November 8, 2021.*