Samir Kušmić

Curriculum Vitae

I am a graduate student at New Mexico State University studying astronomy. My interests are in galaxy populations and galactic evolution, and their cosmological implications, during the Epoch of Reionization. I am working under the primary supervision of Dr. Kristian Finlator, where we are using cosmological simulations to understand the properties of the IGM and CGM at Reionization. By the time that I perform my dissertation work, I hope to develop a project to look at the relation between the galactic population, their CGM, and the IGM throughout Reionization and develop intuition on what certain quantity with observables corresponds to certain processes and/or properties.

Education

2020-Present **New Mexico State University**, *Graduate Student*, Major: Astronomy.

2015–2019 **University of Louisville, Kentucky**, *Bachelor of Science*, Major: Physics with Astrophysics concentration, Minor: Mathematics.
summa cum laude, College of Arts and Sciences

Research Projects

2020–Present **IGM and CGM During Reionization**, *New Mexico State University*, Astronomy Department.
We use the *Technicolor Dawn* simulation to study the state of the IGM and CGM throughout Reionization. We want to udnerstand how the structure of each element and its ionization was distributed and can it be observationally confirmed.

2019–2020 **Gamma-Ray Emissions from Galaxies: Understanding Properties with Energy**, *Max Planck Institute for Nuclear Physics, Fulbright Commission of Germany*.
We explore whether the observed Gamma ray flux is explained by complementary observations in optical, UV, and IR with the goal of constraining models of high-energy emission.

2018 **Morphological Parameters of Galaxies at** $z \sim 8$, *University of Louisville*, Department of Physics and Astronomy.
We looked at high-redshift galaxies and applied scale-invariant morphology analysis. We attempt to see if there are any trends and if further morphological application is viable for high-redshift surveys. We see these high-redshift galaxies do appear to fall under a potential category. Research presented at AAS 233rd as a poster.

2017 **Measuring Sizes & Shapes of Galaxies.**, *University of Louisville*, Department of Physics and Astronomy.
We looked at morphologies and metrics of galaxies in the CANDELS field in order to understand well Sorce Extractor fits. With our research, we try to see if Source Extractor is a good first look for the new, larger surveys that we expect in the coming decade. Research presented at AAS 231st as a poster, ACC Meeting of the Minds, and CUWiP all as posters.

Extracurricular

2020–Present **Astronomy Graduate Student Organization**, *New Mexico State University*, Held Office of – Webmaster.
I maintained the AGSO web pages to make sure that the presented information is up-to-date and relevant to all students within the department. Additionally, I maintained the directory pages for all graduate students whenever they need to be updated with new information, e.g. paper publications, conference attendance, research summary, etc.

2017–2019 **Society of Women in Physics and Astronomy**, *University of Louisville*, Held Office of – Chamberlain (Treasurer).
I secured continued funding for two years" or "expanded funding by reaching out to alumni and government resources. I assisted in preparing students to attend the CUWiP conferences during my time of service and assisted in preparing the Science Day field trip for middle-school students in March of 2019, which included organizing the event and volunteering to prepare and present for the astronomy booth during the event.

2017–2018 **Society of Physics Students**, *University of Louisville*, Held Office of – Social Officer.
I organized social events for fellow students to hang out and get to know each other. I also helped organize the chapter's lab visits and the solar eclipse viewing event in 2017.

Awards and Achievements

2018 **William Marshal Bullitt Scholar, University of Louisville:** Given to astronomy students with an exceptional undergraduate in studies and research.

2018 **Bullitt Best Paper Award in Astronomy, University of Louisville:** annual award for best astronomy paper in the university. My paper was my research poster over my work with Dr. Holwerda: Morphological Parameters of Galaxies at $z \sim 8$ in the BoRG and CANDELS Survey.

2018 **Joined ΣΠΣ (Sigma Pi Sigma) Physics Honors Society**

2018 **James T. Drautman Award Co-Recipient, University of Louisville Department of Physics and Astronomy:** Annual award given to excellent sophomores and juniors of the department.

2017 **Bullitt Best Paper Award in Astronomy Co-Recipient, University of Louisville:** annual award for best astronomy paper in the university. My paper was my research poster over my work with Dr. Holwerda: Measuring the Sizes & Shapes of Galaxies.

2016–2018 **Academic Commonwealth Scholarship, University of Louisville:** Continual financial award of 2800 US$ for as long as I achieve a GPA of a 3.0

2015–2016 **Trustees Scholar, University of Louisville:** Awarded one semester of financial aid of 2000 US$

2015–2019 **University of Louisville College of Arts and Sciences Dean's List**

First-Author Publications

2019 **Morphological Parameters of Galaxies at z $\sim$ 8 in the BoRG and CANDELS Survey**, 2019RNAAS...3..134K

2019 **Morphometric analysis and application in galaxy evolution and high-redshift surveys**, *Bachelor of Science Honors Thesis*, https://ir.library.louisville.edu/honors/201/

Teaching Experience

2020–Present **Graduate Teaching Assistant**, *New Mexico State University*, Las Cruces, NM.

I taught the laboratory sections for our introductory astronomy class (ASTR-1115), which covers a broad spectrum of topic from nearby on Earth (e.g. seasons), our Sun and Solar System, stars, galaxies, and basic cosmological observation (i.e. Hubble's Law). This includes physical characteristics of objects, and how astronomers measure them (e.g. parallax, optics, and spectroscopy). I have taught in both an in-person and online environment. Additionally, I grade for these lab sections and assist in grading when needed from the professor.

2017–2019 **Undergraduate Teaching Assistant**, *University of Louisville PRIMES Program*, Louisville, KY.

I taught in a laboratory and I helped offer students office hours for the elementary astronomy class. As well, I taught and I helped students during recitation for the freshman calculus-based physics for classical mechanics, rotational and wave motion, and thermodynamics.

2016–2017 **CRLA-Certified Level 2 Tutor**, *University of Louisville REACH Center*, Louisville, KY.

Responsibilities included planning small group sessions, mediating student interaction, facilitating student learning in many introductory physics courses, assessing the progress of each individual student, and providing end-of-course study session prior to finals.

Conferences/Presentations

Nov. 19, 2021 **37th Annual New Mexico Symposium**, *NRAO*.
Presented a virtual poster: Assuming Ionization Equilibrium and the Impact on the Lyman-α Forest Power Spectrum during the End of Reionization at $8 \leq z \leq 5$.

Jun. 2021 **SAZERAC 2.0**.
Attended all talks.

Jan. 2019 **American Astronomical Society's 233st Meeting**, *AAS*.
Presented a poster: Morphological Parameters of Galaxies at $z \sim 8$ in the BoRG and CANDELS Survey.

Jan. 2018 **American Astronomical Society's 231st Meeting**, *AAS*.
Presented a poster: Measuring the Sizes & Shapes of Galaxies.

Grants

2022 **NASA FINESST**, *Pending*.

2021 **NSF Graduate Research Fellowship**, *Pending*.

2021 **New Mexico Space Grant Graduate Research Fellowship**, *Declined*.

2019 **Fulbright Fellowship**, *Accepted*.
This grant was for a 10-month paid research period at MPIK in Heidelberg, Germany to work on the 'Gamma-Ray Emissions from Galaxies: Understanding Properties with Energy' project.

References

Dr. Kristian Finlator, *New Mexico State University*, Assistant Professor.

Dr. Benne Holwerda, *University of Louisville*, Associate Professor.

Dr. Gerard Williger, *University of Louisville*, Professor.

Dr. Richard Tuffs, *Max Planck Institute for Nuclear Physics*, Research Scientist.