

SERENA A. CRONIN

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EDUCATION

The Ohio State University

Aug. 2016 - Dec. 2020

B.S. Astronomy and Astrophysics with Research Distinction

Columbus, OH

Cum Laude

Undergraduate Thesis: *The Local Environments of Low-Redshift Supernovae*

Minor: Spanish

Environmental and Natural Resources Scholar

Avon High School (Ohio)

Aug. 2012 - May 2016

SKILLS

Programming Languages

Python, C++

Other Technical Skills

Linux, L^AT_EX, CASA, Wolfram Language (Mathematica)

Foreign Languages

Spanish (intermediate)

RESEARCH EXPERIENCE

National Radio Astronomy Observatory Intern (REU & Post-Bac.)

May 2020 - present

Project: *Molecular Clouds Toward the Supermassive Black Hole Sgr A**

Socorro, NM

Advisors: *Juergen Ott, David Meier, and Brian Svoboda*

Analyzing ALMA data of radio absorption features in molecular clouds along the line-of-sight to Sgr A*. Aiming to study the clouds nearest Sgr A* in order to understand the physics of the SMBH's environment. Using chemistry, kinematics, and CO isotopologues to properly identify clouds in the Galaxy. Preliminary results show detections of clouds in the CMZ and around the 3 kpc arm of the Galactic bar. Future work with unidentified absorption and emission features will be conducted as a post-baccalaureate intern in order to reveal CND clouds. Presented preliminary results in a talk at the NRAO Summer Student Symposium. Participated in a week-long radio astronomy boot camp. Collected and presented data from the 20-meter telescope at Green Bank.

Summer Undergraduate Research Program Intern

May 2019 - July 2019

Project: *The Local Environments of Low-Redshift Supernovae*

Advisors: *Dyas Utomo and Adam Leroy*

Columbus, OH

Participated in a summer-long research program at The Ohio State University Department of Astronomy. Presented preliminary results in a talk at the annual SURP Symposium. See below for project details.

Undergraduate Research Assistant

Aug. 2018 - present

Advisors: *Dyas Utomo and Adam Leroy*

Columbus, OH

Locating ~ 500 supernovae in high-luminosity, low-redshift galaxies using The Open Supernova Catalog and WISE and *GALEX* photometry. Investigating the correlations between supernova type and the properties of the local ISM at these explosion sites measured via infrared and ultraviolet emission. Correlations between star formation tracers (UV and mid-IR) and stellar surface density (near-IR) show that Type Ia supernovae track the stellar mass distribution, Type II supernovae are linked with star formation, and Type Ibc supernovae track the dust of their host galaxies. Undergraduate thesis awarded in December 2020. First-author APJ publication to be submitted in January 2021. [Github](#).

PRESENTATIONS

AAS 237

January 2021

The Local Environments of Low-Redshift Supernovae

[iPoster presentation](#). Chambliss Astronomy Achievement Student Award Honorable Mention.

NRAO Summer Student Symposium

August 2020

What Surrounds the Supermassive Black Hole Sgr A?*

[Virtual talk](#) given to all NRAO sites at the end of the NSF NRAO REU program.

Denman Undergraduate Research Forum

March 2020

Where Do Stars Explode in Galaxies? The Local Environments of Low-Redshift Supernovae.

Poster presentation at The Ohio State University 25th Annual Denman Research Forum.

APS Conference for Undergraduate Women in Physics

Jan. 2020

Where Do Stars Explode in Galaxies? The Local Environments of Low-Redshift Supernovae.

Poster presentation at Carnegie-Mellon University.

Summer Undergraduate Research Program Symposium

July 2019

The Local Environments of Low-Redshift Supernovae.

Talk given at the annual SURP Symposium at The Ohio State University Department of Astronomy.

REPORTS AND FORTHCOMING PAPERS

Molecular Clouds Toward the Supermassive Black Hole Sgr A*

August 2020

Cronin, S., Ott, J., Meier, D., Svoboda, B.

[NRAO REU Report](#), which also serves as the first draft of a paper that is in preparation.

The Local Environments and Rates of Low-Redshift Supernovae [*in prep*]

Cronin, Serena A., Utomo, Dyas, Leroy, Adam K., Behrens, Erica A., Holland-Ashford, Tyler, Koch, Eric W., Lopez, Laura A., Williams, Thomas G.

Will be submitted to the *Astrophysical Journal* in January 2021.

TEACHING EXPERIENCE

Teaching Assistant

Jan. 2017 - present

Course: ASTRON 1101

Columbus, OH

Supervisor: Wayne Schlingman

Teaching laboratory sections and assisting lecture instructors for an introductory astronomy general education course. Managing classrooms, evaluating homework and lab reports, preparing and proctoring exams, tutoring during office hours, facilitating lab demonstrations, training instructional assistants, conducting assessment review, and course development (Canvas).

AWARDS AND HONORS

Chambliss Astronomy Achievement Student Award

Jan. 2021

Honorable Mention at AAS 237.

Undergraduate Research Scholarship

Nov. 2019

Awarded by The Ohio State University Arts and Sciences Honors Committee.

Astronomy Undergraduate Scholarship

Aug. 2019

Awarded by The Ohio State University Department of Astronomy.

Dean's List

Fall 2020, Spring 2020, Fall 2019, Spring 2018

LEADERSHIP AND OUTREACH

Environmental and Natural Resources Scholars

Mentor

Aug. 2017 - May 2018

Member

Aug. 2016 - May 2018

Alum of The Ohio State University Environmental and Natural Resources Scholars - an outreach program and service-learning community. Discussed environmental issues with local non-profits and participated in environmentally focused service projects. Mentored a group of first-year students in setting academic goals, taking advantage of campus resources, getting involved in extracurricular activities, and navigating campus.

Casual Sports Club

Founder, Vice President

June 2017 - May 2018

Founded Casual Sports Club at The Ohio State University. Goals of the organization were to cultivate an inclusive, friendly environment open to all students with an interest in playing a wide-variety of recreational sports regardless of skill or experience. Organized weekly events and managed social media and email.

OSU Arne Slettebak Planetarium

Trained Presenter

August 2016 - May 2017

Trained to present shows to a broad range of audiences at the Arne Slettebak Planetarium on OSU's campus.

INVOLVEMENT

American Astronomical Society

Member

November 2020 - present

OSU Astronomical Society

Member

August 2016 - present

Attending meetings and talks. Participated in two trips to the Green Bank Observatory in 2017 and 2019 and collected data with their 40-foot telescope. Participated in a trip to the John Glenn Astronomy Park in Hocking Hills, OH (2019). Attended the 2017 Conference for Undergraduate Women in Physics (CUWiP).