

Samantha Creech

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Education

PhD candidate, *August 2021-present*

University of Utah

BS in Physics, *summa cum laude* *May 2020*

University of North Carolina at Asheville

- Minors in astronomy and math
- 3.97/4.00 GPA
- Physics GPA: 3.97/4.00

Honors and awards

Graduate school

Swigart fellow 2022

EDGES fellow 2021

Undergraduate

Manly E Wright Award (valedictorian award) 2020

Distinction as a University Scholar 2020

**Astronomy Club of Asheville-Carolyn Keefe
Scholarship 2019**

North Carolina Space Grant 2018

Research Experience

Research Assistant *January 2022-Present*

University of Utah, Salt Lake City, UT

- Created automated Python and bash scripts to analyze time-domain X-ray data of Active Galactic Nuclei
- Used IDL, Xspec, and Python to analyze *NuSTAR* X-ray data of the Perseus Cluster
- Characterized the systematic uncertainty for *nucrossarf*, a software suite that accounts for scattered light in spectral analysis

Astrophysics REU Participant *May-August 2019*

University of Wisconsin–Madison, WI

- Performed laboratory tests of optical fibers for use in the next generation of neutrino telescopes
- Built and ran particle simulations using C++ and Geant4
- Analyzed and compared laboratory and simulation data using Python, C++, and ROOT
- Presented results at the UNCA Undergraduate Research Symposium (November 2019), and the American Astronomical Society meeting in Honolulu (January 2020)

Astrophysics Research Assistant *August 2017-May 2021*

University of North Carolina at Asheville, NC

- Used Python to analyze infrared images from the Hubble Space Telescope
- Analyzed galaxy morphology using Galfit and SAOImage DS9
- Presented results at the UNCA Undergraduate Research Symposium (November 2018), the American Astronomical Society meeting in Seattle (January 2019), and the UNCA Foundation Board meeting (December 2019)
- Second author *The Geometry Of Cold, Metal-Enriched Circumgalactic Gas Around Galaxies at z~1.2*

Professional Publications

In astronomy, authors are ordered by contribution to the published work

Creech S, Dan W, et al. The *NuSTAR* View of Perseus: the ICM and a Peculiar Hard Excess. *Submitted to the Astrophysical Journal*. arXiv:2401.16616

- **Contribution:** Performed comprehensive analysis and authored the entirety of the paper, with feedback and suggestions from co-authors

Civano F, Zhao X, Boorman P, Marches S, Ananna T, **Creech S**, Chen C.T, Hickox R, Stern D, Madsen K, García J.A, Silver R, et al. The High Energy X-ray Probe (HEX-P): Bringing the Cosmic X-ray Background into focus. *Submitted to Frontiers in Astronomy and Space Science*. arXiv:2311.04832

- **Contribution:** Performed analysis and contributed text for section 6.1

Boorman P, Torres-Albà N, Annuar A, Marchesi S, Pfeifle R, Stern D, Civano F, Baloković M, Buchner J, Ricci C, Alexander D. M, Brandt W. N, Brightman M, Chen C. T, **Creech S**, Gandhi P, García J. A, Harrison F, Hickox, R, Kammoun E, LaMassa S, Lanzuisi G, Marcotulli L, Madsen K, Matt G, Matzeu G, Nardini E, Piotrowska J. M, Pizzetti A, Puccetti S, Sicilian D, Silver R, Walton D. J, Wilkins D. R, Zhao X. The High Energy X-ray Probe (HEX-P): The Circum-nuclear Environment of Growing Supermassive Black Holes. *Submitted to Frontiers in Astronomy and Space Science*. arXiv:2311.04832

- **Contribution:** collaborated and contributed ideas through engagement in bi-weekly meetings

Lundgren B, **Creech S** et al. The Geometry Of Cold, Metal-Enriched Circumgalactic Gas Around Galaxies at $z \sim 1.2$. *The Astrophysical Journal*, v913, p50, 202. arXiv:2102.10117

- **Contribution:** Created ~half of the figures and performed analysis/contributed text for sections 4.5 and 4.6

Professional Presentations

Creech S, Civano F, Silver R, Xiurui Z. The 5 Year Monitoring Campaign of the JWST Time-Domain Field in the NEP with *NuSTAR* and XMM-Newton. Poster presented at: 243rd American Astronomical Society conference; 2024 Jan 7-11; New Orleans, LA.

Creech S, Dan W. Evidence of a Hard Excess in *NuSTAR* Spectra of the Perseus Cluster's Diffuse Intracluster Medium. Talk presented at: HEAD20 meeting; 2023 March 29; Waikōla, HI.

Creech S, Park N, Hanson K. Testing the Efficiency of Wavelength-Shifting Fibers for the Next Generation of Neutrino Telescopes. Poster presented at: 235th American Astronomical Society conference; 2020 Jan 4-8; Honolulu, HI.

Creech S, Park N, Hanson K. Hunting for Ghost Particles: Building the Next Neutrino Telescope. Talk presented at: UNCA Undergraduate Research Symposium; 2019 Nov 26; Asheville, NC.

Creech S, Lundgren B, Nathan, K. Measuring the Geometry and Extent of Large-Scale Winds around $z \sim 1$ Mg II Selected Galaxies using Infrared Imaging from the Hubble Space Telescope. Poster presented at: 233rd American Astronomical Society conference; 2019 Jan 6-10; Seattle, WA.

Creech S., Lundgren B. Galactic Winds: Probing the Gas of the Early Universe. Talk presented at: UNCA Undergraduate Research Symposium; 2018 Dec 4; Asheville, NC.

Conferences Attended

- American Astronomical Society (AAS)- New Orleans, Louisiana, January 2024
 - High Energy Astrophysics Division Meeting (HEAD)- Waikōloa, Hawai'i, March 2023
 - American Astronomical Society (AAS)- Virtual, June 2020
 - Conference for Undergraduate Women in Physics (CUWiP)- College Park, Maryland, January 2020
 - American Astronomical Society (AAS)- Honolulu, Hawai'i, January 2020
 - American Astronomical Society (AAS)- Seattle, Washington, January 2019
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Teaching and Outreach Experience

Volunteer Gallery Interpreter *April 2023-Present*

Natural History Museum of Utah, Salt Lake City, UT

- Communicated scientific findings to general public
- Planned interactive activities for museum visitors of all ages
- Interpreted paleontology displays in the Past Worlds exhibit

Physics Lab Teaching Assistant *August -December 2021*

University of Utah, Salt Lake City, UT

- Provided weekly lectures to introduce each lab for PHYS 2220: the introductory physics lab for scientists and engineers
- Facilitated student discussion and conceptual understanding during lab activities
- Graded all student assignments and provided thorough feedback

Intern Interpretive Dark-Sky Ranger *May -August 2021*

Bryce Canyon National Park, Bryce City, UT

- Designed engaging interpretive astronomy programs such as constellation tours, a full-moon interpretive night hike, and a 40-minute ranger talk
- Built an interactive light-pollution model to educate school groups on dark-sky-friendly lighting
- Interacted with visitors and communicated important park information
- Used scientific equipment to monitor light pollution and wrote the park's annual dark sky report

Physics Tutor *August 2019-May 2020*

University of North Carolina at Asheville

- Provided in-person instruction to students in introductory physics classes
- Assisted students in the transition to remote learning

In Real Life (IRL) After-School Program Leader *September-November 2019*

Asheville Middle School, Asheville, NC

- Planned and led lab activities for IRL, which is an after-school program for at-risk middle school students
- Taught students basic topics from astronomy including spectroscopy, telescope optics, and stellar evolution
- Supervised the students during labs and activities

Teaching Assistant *January-May 2020*

University of North Carolina at Asheville

- Created and executed lesson plans for the Outdoor Leadership Training Program
- Planned and led a five-day climbing training for the twelve students in the class
- Helped coordinate the transition from in-person to online instruction

Observatory Docent *August 2017-May 2020*

UNCA Lookout Observatory, Asheville, NC

- Operated computerized telescopes and SkyX software
 - Taught astronomy and physics concepts to the general public
 - Worked monthly public stargazes
 - Led outreach activities for summer camps, school groups, and on-campus programs
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Educational Publications and Presentations

Creech S. "Volcanoes of the Solar System" Talk presented at: Salt Lake City Astronomy on Tap; October 17, 2023

Creech S. "Pushing the Horizon: How astronomers came together to take the first picture of a black hole" Talk presented weekly at: Bryce Canyon National Park; June-August 2021 and presented again at Salt Lake City Astronomy on Tap; March 21 2023

Creech S. "Io's Stealthy Volcanoes." *Physics Today Daily Edition*, August 18 2020.
DOI:10.1063/PT.6.1.20200819a

Creech S. "Machine Learning Predicts Honeybee Swarms." *Physics Today Daily Edition*, July 24 2020.
DOI:10.1063/PT.6.1.20200724a

Professional Experience

Society of Physics Students Intern: *Physics Today Science Writer* *June-August 2020*

American Institute of Physics, College Park, MD

- Reviewed scientific journals to find stories for *Physics Today*, a magazine that targets the physics community
- Interviewed lead researchers for stories
- Wrote and published articles in *Physics Today* that successfully communicate technical research
- Presented my experience at the SPS Internship Symposium

Information Technology intern *June-August 2017*

Pisgah Astronomical Research Institute (PARI), Rosman, NC

- Created three-dimensional models of planetary features such as craters, canyons, and mountains using Python and Blender
 - Used 3D printers to create physical prints of planetary models
 - Expanded capabilities of a python-blender script that uses planetary elevation data to make three-dimensional models
 - Searched astrogeology databases for compatible data of terrestrial bodies
 - Created an interpretive video describing the 3D Planets program that my work contributed to
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Other Experience

Graduate Student Advisory Committee (GSAC) Chair Elect *June 2023-present*

University of Utah

- Trained to take over as next year's GSAC chair
- Co-planned, organized, and hosted open door meetings and town halls
- Advocated on behalf of grad student issues to the department

Student Leader for Physics and Astronomy Society for Support and Advocacy for Gender Equity (PASSAGE)

August 2022-May 2023

University of Utah

- Planned, organized, and hosted social events
- Facilitated the development of community among gender minorities in the department
- Assisted hosting professional development workshops

Graduate Student Advisory Committee (GSAC) Treasurer and Member *June 2022-June 2023*

University of Utah

- Presented monthly budgetary updates to the committee
- Identified and resolved budget discrepancies

NOLS Student *September 2020-December 2020*

NOLS Rocky Mountain branch

- Developed advanced leadership skills in a high-stress environment
- Learned advanced technical skills in a field setting
- Planned and executed a logistically challenging, week-long Independent Student Group Travel (ISGE)

Society of Physics Students Chapter President *August 2019-May 2020*

University of North Carolina at Asheville

- Led officer and club meetings
- Planned, organized, and executed club events
- Organized physics outreach training for new club members
- Organized and lead physics demonstrations for visiting middle school classes

Outdoor Programs: Trip Leader and Office Supervisor *August 2017-May 2020*

UNCA Campus Recreation, Asheville, NC

- Taught technical and soft skills to participants during climbing, backpacking, caving, and mountain biking trips
- Problem solved in high-stress environments
- Trained and supervised staff working the Outdoor Programs office
- Led incoming students during wilderness orientation trips for three year