Samantha Creech

**Location:** 1366 E 2700 S, Salt Lake City, UT, 84106

**Email:** s.creech@utah.edu ∙ **Phone:** (828)-551-4730

Education

**PhD Student,** *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

* Used IDL, Xspec, and Python to analyze *NuSTAR* x-ray data of the Perseus Cluster
* Characterized the temperature distribution of the Intracluster Medium (ICM)
* Investigated possible detection of Inverse Compton scattering in the ICM
* 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 testsof 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 GalfitandSAOImage DS9
* Interpreted results and created plots using packages including matplotlib, pandas, SciPy**,** and NumPy
* 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*

Teaching and Outreach Experience

**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 the importance of dark-sky-friendly lighting
* Interacted with visitors and communicated important park information such as trail details, conditions, and park regulation

**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

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 Toda*y, 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

Other Experience

**NOLS Student** *September 2020-December 2020*

NOLS Rocky Mountain branch

* Developed leadership skills in a wilderness setting
* Learned advanced technical skills in outdoor recreation
* Planned and executed a 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 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’ wilderness orientation trips (Pre-Rendezblue) for three years

Technical Competencies

* Galfit
* SAOImage DS9
* C++
* IDL
* Python
* ROOT
* LaTeX
* Xspec
* Python packages including SciPy, matplotlib, NumPy, and pandas

Conferences Attended

* American Astronomical Society (AAS)- Seattle, Washington, January 2019 and January 2020
* American Astronomical Society (AAS)- Honolulu, Hawaii, January 2020
* Conference for Undergraduate Women in Physics (CUWiP)- January 2020

Professional Publications and Presentations

Lundgren B, **Creech S** et al. The Geometry Of Cold, Metal-Enriched Circumgalactic Gas Around Galaxies at z∼1.2.

**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~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.

Educational Publications and Presentations

**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

**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