Catherine Slaughter

Early-Career Astronomer

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Education

2021–2023 **MSc in Astronomy Research**, *Leiden University*, Leiden, Netherlands.
Average Grade: *8.24/10*
US Equivalent GPA[1]: *3.95/4.0*
First-Year Research Project: *A Modeled Radiation Field Search for Bubble Structures in the Greater Orion Nebula*
Master's Thesis: *Disentangling the Shadows of a Planetary Collision Around ASASSN-21qj*

2017–2021 **BA in Astronomy and Physics**, *Dartmouth College*, Hanover, NH.
GPA: *3.54/4.00*
Studied abroad and participated in an observing run at SAAO in South Africa Jan-Mar 2019.

Research Experience

2022–Present **Master's Thesis Project**, *Leiden University*, Kenworthy Group, Leiden, NL.
Using python to model impacts of planetesimal collisions on stellar light curves. Ultimate goal is to recreate observed collision remnant light curve. While such systems have not been frequently observed in the past, LSST is expected to find more. Such simulations will aid future studies of these forthcoming observations.

2021–2022 **First Year MSc Project**, *Leiden Observatory*, Tielens Group, Leiden, NL.
"A Modeled Radiation Field Search for Bubble Structures in the Greater Orion Nebula Region." Used SOFIA and Herschel data, along with a new radiation-field modeling code to develop a method for searching for kinematic structures in gas clouds based on expected local radiation field contribution. Additionally identified a possible previously unreported fossil bubble structure in Orion Molecular Cloud A.
Report Grade: *8/10*, A

2020–2021 **Undergraduate Culminating Research Project.**, *Dartmouth College Dept. of Physics and Astronomy*, Chaboyer Group, Hanover, NH.
"Refining the Age of the Universe with Globular Clusters." Implemented new numerical analysis methods along with Monte Carlo Main-Sequence fitting as done in O'Malley et al. 2017 to determine the ages of several nearby globular clusters with significantly decreased error. Doing so sets a hard lower limit for the age of the universe, potentially helpful for future research in the Hubble Tension.

2020–2021 **Caltech SURF**, *California Institute of Technology*, Harrison Group, Pasadena, CA.
"Analyzing Straylight X-ray Binaries with NuSTAR." Analyzed previously unused stray-light observations from NuSTAR of several low-mass neutron star x-ray binaries. Began as a Summer project, but work continued into the school year for extracurricular interest.

2018–2019 **Undergraduate Researcher**, *Dartmouth College Dept. of Physics and Astronomy*, Chaboyer Group, Hanover, NH.
"Improving Metal-Poor Stellar Evolution Models." Calibrated DSED stellar evolution models against certain metal-poor subdwarfs. Analyzed spectral data and measured emission line equivalent widths in SPLOT. Created model atmospheres using MOOG.

Publications

Martin Yang et al. Determining the Age of M92 using Monte Carlo Simulation. *Submitted for Publication.*

Brian Grefenstette et al. StrayCats: A Catalog of NuSTAR Stray Light Observations. *ApJ*, 2021.

[1] Conversion calculation can be found in *this spreadsheet*.

Poster Presentations and Colloquia

Upcoming **AAS Annual Meeting**, Seattle, WA, Poster.
"A Modeled Radiation Field Search for Feedback Structures in the Greater Orion Nebula Region"

Aug 2020 **Caltech SFP Symposium**, Pasadena, CA, Poster.
"Analyzing Straylight X-ray Binaries with NuSTAR"

May 2020 **Wilder Department Symposium**, Hanover, NH, Poster.
"Refining the Age of the Universe Using Globular Clusters: Prerequisite Work"

May 2018 **Wetterhan Science Symposium**, Hanover, NH, Poster.
"Improving Metal-Poor Stellar Evolution Models"

Grants & Fellowships

2021-2022 **James B. Reynolds Scholarship for Foreign Study**, $25,000.
Fellowship awarded to recent Dartmouth graduates pursuing long-term research or study outside the United States.

Summer 2020 **Caltech SURF Grant**, $6620.
Awarded to Caltech Summer Undergraduate Research Fellows.

Spring 2019 **Dartmouth College Undergraduate Leave Term Grant**, $5200.
Grant awarded to students conducting a term of full-time research.

2018–2019 **Dartmouth College Sophomore Research Scholar**, $2000.
Grant awarded to second-year students assisting faculty in their research.

Spring 2018 **Women in Science Project Fellowship**, Paid Hourly.
Funding for first-year undergraduate women at Dartmouth College to engage in research in the sciences.

Honors and Awards

Nov 2019 **Francis L. Town Scientific Prize (Physics and Astronomy)**, *Dartmouth College*.
A prize offered annually to "one meritorious and deserving student in each department of scientific study at the College" at the end of Sophomore year.

Teaching and Outreach Experience

Summer 2022 **Astronomer in Residence**, *CIDSR and Boise State University*, Part-Time, Central Idaho.
Traveled around the Central Idaho Dark Sky Reserve (with particular focus on the towns of Stanley, Ketchum/Sun Valley, and Hailey) for various public outreach and engagement events. Duties included public observing, lecturing, mentoring undergraduate students in outreach, and curriculum development.

2018–2021 **Public Observing Guide**, *Dartmouth College Dept. of Physics and Astronomy*, Part-Time, Hanover, NH.
Designed and Lead weekly PO programs serving Dartmouth College and the greater community in the Upper Valley. Duties included nighttime lecturing, target selection, and telescope setup and operation.

2019–2021 **Dartmouth Emerging Engineers Tutor**, *Thayer School of Engineering*, Part-Time, Hanover, NH.
Tutored first-year students taking introductory math, physics, and computer science courses. The DEE program especially targets first-gen and low-income students for peer support and mentoring.

Summer 2019, Spring 2020 **Introductory Astronomy Teaching Assistant**, *Dartmouth College Dept. of Physics and Astronomy*, Part-Time, Hanover, NH.
Teaching assistant for an introductory astronomy course geared toward arts and humanities students. Duties included conducting lab sessions, grading, and general student support.

Summer 2018 **Astronomy and Nature Guide**, *Mountains of Stars*, Full-Time, Crawford Notch, NH.
Worked with the general public in order to educate about astronomy, spread awareness for environmental issues, and encourage widespread social change. Duties included lecturing, target selection, telescope setup and operation, tabletop demonstrations, planetarium shows, and social media management.

Relevant Extracurriculars

2022-Present **VAST Organizing Committee**, *Virtual Astronomy Software Talks*, Volunteer.
Assists in the planning, organization, and presentation of *VAST* seminars. Primary role includes establishing connection with European colleagues as presenters and attendees, monitoring audience questions, and general planning.

Skills

Programming	Bash, C, C++, Fortran, Java, MATLAB, Python, VHDL	*Experienced*
	CSS, HTML	*Beginner*
Software	AMUSE, Conda, DS9, LaTeX, Linux/OSX Terminal, MOOG, PyRAF, XSPEC	
Language	English-First Language, Spanish-Conversational	
Other	Telescope Operation and Maintenance, Social Media Management, Science Commmunication	