CLARA E. BRASSEUR

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EDUCATION

University of St Andrews; St Andrews, UK *expected 2025*
PhD, Astronomy
Supervisor: Prof. Moira Jardine

Liverpool John Moores University; Liverpool, UK *2019*
MSc with distinction, Astrophysics

Mills College; Oakland, California *2010*
MA, Music Composition

Oberlin College; Oberlin, Ohio *2008*
BA, Astrophysics and Music Composition. Mathematics minor

SELECTED EXPERIENCE

Postgraduate Researcher *September 2021 – present*
University of St Andrews, St. Andrews, UK

- Multiwavelength study of AB Doradus; combining radio imagery with coronal magnetic field model based on surface magnetic field maps to explore the magnetic structure of the star.
- Developing software to create synthetic images from coronal magnetic field models.
- Forthcoming paper "Constraining the Corona Properties of AB Dor in the Radio Regime."

Software Engineer *May 2016 – August 2021*
Space Telescope Science Institute (STScI), Baltimore, MD

- Software developer at the Mikulski Archive for Space Telescopes (MAST).
- Created scalable all-sky imagery from Panoramic Survey Telescope and Rapid Response System (PanSTARRS) data.
- Documented, improved, and extended the MAST Application Programming Interface (API).
  - Developed MAST module for Astroquery Python package
  - Led trainings on usage of RESTful and Python APIs
  - Developed new API functionality for image cutouts
- Developed Astrocut python package for astronomical image cutouts, providing streamlined data access to astronomers and relieving pressure on archive infrastructure.
- Developed Astronify python package for sonifying time series data, helping to increase access to astronomical data for blind and visually impaired astronomers.
- Developed interactive plots for the MAST web interfaces exo.MAST and z.MAST.
- Provided user support including responding to helpdesk questions.
- Sustaining engineering for general software maintenance and reduction of technical debt.
- Supported and mentored undergraduate interns.

Research Assistant for Dr. Rachel Osten *Septemper 2015 – August 2021*
Space Telescope Science Institute (STScI), Baltimore, MD

- Multiwavelength (visible/ultra-violet) exploration of stellar flares using the overlapping surveys from the Galaxy Evolution Explorer (GALEX), and Kepler space telescopes.
- Detected and analyzed a collection of short-duration ultra-violet flares in GALEX data, leading to Brasseur et al, 2019.
- Explored Kepler flares in corresponding Kepler data to better understand flare energy fractionation and frequency distributions, leading to Brasseur et al, 2022.

Cryptanalyst *July 2011 – April 2016*
National Security Agency (NSA), Fort Meade, MD

- Devised statistical and analytic tests for data diagnosis; developed software to apply tests and processing based on results.
- Modified high interest information gathering algorithm, by using theoretical mathematics to explore trade-offs in effort, efficiency, and accuracy.
- Designed algorithm in C/C++ for implementation of secure information sharing protocol and worked jointly to implement it in a cross-platform application. Achieved five-fold improvement in application speed through parallelization of code. Demonstrated program prototype to management and potential customers.
- Brought legacy production Perl scripts up to agency coding standards, adding robust error handling, increased flexibility in supported file types, and detailed succinct logs

HONORS AND AWARDS

Arthur Maitland Prize *2023*
Awarded to the best student talk in Physics and Astronomy.

Astropy Moore Foundation/NASA ROSES Grants *2021,2022*
$18,500, "Astroquery Maintenance"
$6,600, "Develop Astropy Learn Materials"

AURA Technology and Innovation Outstanding Achievement Award *2020*
Award presented annually to a single individual or team among all AURA centers for significant innovative contribution and demonstrated excellence in an area of technology. Sole recipient of the 2020 award in recognition of development work for Astrocut and associated cutout services.

Co-I in STScI Director's Discretionary Research Fund Grant *2019*
"Sonifying MAST: Engagement and Accessibility for The BVI Community"
$60,000, PI Dr. Scott Fleming

NASA Astrophysics Data Analysis Program Grant *2019*
"Mining Multiwavelength Flares with Kepler and GALEX"
$141,400, PI Dr. Rachel Osten

STScI Team Award *2019*
Awarded in recognition of the TESS data archive release success.

Co-I in STScI Director's Discretionary Research Fund Grant *2018*
"Mining Multi-wavelength Flares with Kepler and GALEX"
$32,000, PI Dr. Rachel Osten

Music Alumni Scholarship *2008-2009*
Awarded in support of graduate studies in music composition at Mills College.

Vance Mathematics scholarship *2004-2008*
Application-based scholarship awarded in support of mathematics study at Oberlin College.

John F Oberlin scholarship *2004-2008*
Merit-based scholarship awarded in support of undergraduate studies at Oberlin College.

REFEREED PUBLICATIONS

Brasseur, C. E., Rachel A. Osten, Isaiah I. Tristan, and Adam F. Kowalski. "Constraints on Stellar Flare Energy Ratios in the NUV and Optical from a Multiwavelength Study of GALEX and Kepler Flare Stars" The Astrophysical Journal 994.1 (2023): 5.

Astropy Collaboration, Adrian M. Price-Whelan, Pey Lian Lim, Nicholas Earl, Nathaniel Starkman, Larry Bradley, David L. Shupe, Aarya A.Patil, Lia Corrales, **C. E. Brasseur**, et al. "The Astropy Project: Sustaining and Growing a Community-oriented Open-source Project and the Latest Major Release (v5.0) of the Core Package" The Astrophysical Journal 935.2 (2022): 167.

Fleming, Scott W., Chase Million, Rachel A. Osten, Dmitrii Y. Kolotkov, and **C. E. Brasseur**. "New Time-Resolved, Multi-Band Flares In The GJ 65 System With gPhoton" submitted to The Astrophysical Journal (2020).

Brasseur, C. E., Rachel A. Osten, and Scott W. Fleming. "Short-duration Stellar Flares in GALEX Data." The Astrophysical Journal 883.1 (2019): 88.

Ginsburg, Adam, B. M. Sipőcz, **C. E. Brasseur**, et al. "astroquery: An Astronomical Web-querying Package in Python." The Astronomical Journal 157.3 (2019): 98.

SOFTWARE

Astroquery: tools for querying astronomical web forms and databases *astroquery.readthedocs.io*

- Package maintainer.
- Contributes to package health and infrastructure efforts.
- Original developer of the MAST module.

Astronify: astronomical data sonification *astronify.readthedocs.io*

- Original lead developer and maintainer for this Python package.
- Open source and accepting community contributions (github.com/spacetelescope/astronify).
- Used to sonify MAST light curve data.

Astrocut: astronomical image cutoutss *astrocut.readthedocs.io*

- Original developer and maintainer for this Python package.
- Provided to the community on PyPI Python package index (pypi.org/project/astrocut/).
- Open source and accepting community contributions (github.com/spacetelescope/astrocut).
- Implemented continuous integration/automated testing using GitHub actions and CodeCov.
- Basis for TESScut and zCut cutout services, which allow astronomers to download astronomical cutouts from the TESS mission and Hubble deep field surveys respectively.
- Used (via TESScut) for TESS light curve creation by Python packages Eleanor and LightKurve.

zCut: astronomical cutouts from deep field surveys *mast.stsci.edu/zcut*

- Developed zCut RESTful API on MAST microservice infrastructure.
- Extended Astrocut functionality to support this service.

TALKS (* INDICATES INVITED)

The Radio Corona of AB Dor
May 2023 PhD Annual Assessment Conference, St Andrews, UK

The Radio Corona of AB Dor
April 2023 Bcool Meeting, Göttingen, Germany

*** Hearing the Light: Astronomical Data Sonification**
January and March 2023 Edinburgh and Clydesdale Astronomy societies, available online

*** Software Development in Astronomy**
February 2023 St Andrews Interdisciplinary Science Conference, St Andrews, UK

Stellar magnetic field manifestations: prominences and flares
July 2022 Cool Stars 21, Toulouse, France

*** Making Astronomy More Accessible for Blind and Visually Impaired Audiences**
February 2022 NASA Universe of Learning Science Briefing

Sonifying Your Presentation for Accessibility
November 2021 SciAccess Conference

Hearing The Light: How Sonification Deepens our Understanding of the Cosmos and Makes Astronomy More Accessible
November 2020 Space Telescope Science Institute Public Lecture Series, available online

Astronify: listening to the stars
November 2020 Astronomical Data Analysis Software and Systems conference, available online

*** Stellar Flares in GALEX and Kepler**
July 2020 Centre for Fusion, Space and Astrophysics Seminar, Warwick University, Warwick, UK

*** Work smart not hard:** How Astrocut/TESScut efficiently cuts TESS full-frame image sets
April 2020 Open Planetary Lunch Talks, available online

*** Short Duration Flares in GALAX Data**
December 2019 Solar Focus Meeting, University of Colorado, Boulder, CO

*** Accessing TESS Data Programmatically: A MAST case study**
July 2019 TESS/Kepler Asteroseismology Consortium workshop, MIT, Cambridge, MA

*** TESScut and ExoMAST: Working with TESS Time Series Data**
February 2019 TESS Data Workshop, Space Telescope Science Institute, Baltimore, MD

Astrocut: A cutout service for TESS full-frame image sets
November 2018 Astronomical Data Analysis Software and Systems conference, College Park, MD

Short Duration Flares in GALAX Data
July 2018 COSPAR conference, Pasadena, CA

The MAST API: Accessing Space Telescope Data Programmatically
October 2017 Astronomical Data Analysis Software and Systems conference, Santiago, Chile

POSTER PRESENTATIONS

zCut: extending Astrocut for deep fields
Brasseur, C. & MAST Team. AAS 235, Honolulu, HI [109.21](2020)

MAST APIs: Present to Future
Brasseur, C and Donadson, T. Astronomical Data Analysis Software and Systems conference, Groningen, Netherlands (2019)

AstroCut: A cutout service for TESS full-frame image sets
Brasseur, Clara; White, Rick; Fleming, Scott W.; Mullally, Susan E.; Phillip, Carlita; Hargis, Jonathan; Fox, Mike; Smith, Arfon M. AAS 233 [245.10] (2019)

Short Duration Flares in GALAX Data
Brasseur, Clara; Osten, Rachel A. AAS 232 [317.01] (2018)

COMMUNITY ENGAGEMENT

Astro Hack Week 2022, Science Organizing Committee member.

Python in Astronomy 2020, Science Organizing Committee member.

American Astronomical Society, member 2016-2021.

TECHNICAL SKILLS

Programming Languages and Frameworks
Python, C, C++, C#, Fortran, JavaScript, ExtJS, Perl, Tornado, HTML/CSS, MS SQL, Git, GitHub, Jupyter, LaTex, Overleaf, DS9, Aladdin, Mathematica, VMware/vSphere, Linux, Bash, Condor, WinDbg, GNU Debugger, Valgrind, Visual Studio, Certified Scrum Master

Observing experience
Apache Point Observatory 3.5-meter telescope, 3 nights, ARC Telescope Imaging Camera, Dual Imaging Spectrograph.

TEACHING EXPERIENCE

Computational Astrophysics Demonstrator *January-April 2022,2023*
University of St Andrews, St Andrews, UK
Provided guidance for students in this third year course on both astronomy topics and Fortran programming.

Using Python to Search NASA's Astrophysics Archives *January, June 2018-2021*
American Astronomical Society Meetings
Collaborated with a team of astronomers and software engineers from multiple NASA archives to present a hands-on tutorial/workshop that introduces participants to command-line data access tools specifically using virtual observatory protocols in Python.

TESS Data Workshop *February 2019*
Space Telescope Science Institute, MD
Prepared and taught an hour and a half introduction to the use of the TESScut software.

Introduction to MAST APIs *June 2017*
Space Telescope Science Institute, MD
Prepared and taught workshops on the usage of the MAST RESTful and Astroquery APIs.

Graduate Teaching Assistant *August 2009 – May 2010*
Mills College, Oakland, CA
Prepared and taught two semesters of undergraduate Basic Musicianship II. Initiated restructuring of the Mills musicianship curriculum.