Susan E. **Mullally**

Senior Staff Scientist, Astronomical Data

3700 San Martin Dr., Baltimore, MD 21219

667-218-6536 | smullally@stsci.edu | mustaric.github.io | susanethompson | @mustaric | **née Susan E. Thompson**

Education

University of North Carolina, Chapel Hill — *Chapel Hill, NC*

Doctor of Philosophy in Physics — *1998-2004*

- ***Thesis: Revelations from Time Series Spectroscopy of Pulsating White Dwarf Stars***
- ***Advisor: J. Christopher Clemens***

Hanover College — *Hanover, Indiana*

Bachelor of Arts — *1994-1998*

Work Experience

Space Telescope Science Institute — *Baltimore, MD*

Deputy Project Scientist for James Webb Space Telescope — *Aug. 2020 – Current*

- Science and Budgetary oversight for JWST

Space Telescope Science Institute — *Baltimore, MD*

Senior Staff Astronomical Data Scientist — *Oct. 2017 – Oct. 2020*

- TESS Project Manager for MAST from 2019-2020
- Deputy Branch Manager for 5 mo. in 2020
- Scientific input regarding archive services for exoplanet and time series data
- Improved MAST functionality for JWST observation planning
- AWS Science Platform development with the Data Science Mission Office
- Chaired the SOC for the TESS Data Science Workshop held at STScI

NASA Ames Research Center/SETI Institute — *Mountain View, CA*

Kepler Mission Support Scientist — *Jul 2010 - Jul. 2017*

- Led the creation and evaluation of the final Kepler survey exoplanet catalog
- Developed automated vetting metrics to remove false alarms from the exoplanet catalog
- Interfaced with the MAST and NExScI Archives for Kepler and K2 data deliveries

Princeton University — *Princeton, NJ*

Visiting Scientist — *Jul. 2008 – Jul. 2010*

- Conducted research on variable stars and supernova progenitors

Delaware Asteroseismic Research Center, Univ. of Delaware — *Newark, DE*

Associate Director — *Jul. 2007 – Jul. 2010*

- Organized >20 telescopes to simultaneously take time series observations for >3 weeks to resolve the frequencies of pulsating stars for the Whole Earth Telescope
- Developed software tools to organize and analyze time series photometry.
- Prepared proposals and conducted observations for Whole Earth Telescope runs

The Colorado College — *Colorado Springs, CO*

Assistant Professor — *Jul. 2004– Jun. 2007*

- Taught undergraduate classes in Physics and Astronomy and provided research experiences for undergraduates.

Awards

Honors

AURA	**AURA Team Award,** Awarded to the TESS Data Management and Archive Team	*2019*
NASA	**NASA Silver Achievement Award,** Awarded to the entire TESS group	*2019*
NASA	**NASA Exceptional Scientific Achievement Medal,** Individual award for leading the Kepler planet catalog	*2018*
NASA	**NASA Ames Group Honor Award,** Awarded to the Kepler Mission Archives	*2017*

Grants

PI	**STScI Data Science Initiative Investigation,** Serverless Search for Planets in the TESS Data, $23,500	*2019*
Co-I	**HST Cycle 27,** ID 15856: Search for Secondary Atmospheres in the L98-59 System, 28 orbits	*2019*
Co-I	**TESS Guest Investigator Grant,** Search the JWST Continuous Viewing Zone for Transits	*2018*
Co-I	**TESS Guest Investigator Grant,** White Dwarf Variability in the Ecliptic South	*2018*
Co-I	**HST Cycle 25,** ID 15129: Completing Kepler's Mission to Determine the Frequency of Earth-like Planets	*2017*
Co-I	**Astronomical Data Analysis Program Grant,** Formation and Circularization of Heartbeat Stars	*2017*
Co-I	**K2 Guest Observer Grant,** Discovery and Vetting of Exoplanets, $250,000	*2016, 2017*
PI	**K2 Guest Observer Grant,** Discovery and Vetting Exoplanets, $100,000	*2015*
PI	**Kepler Guest Observer Grant,** Study Tidally Induced Pulsations on Heartbeat Stars, $36,000	*2013*
Co-I	**NSF Major Research Instrumentation Program,** Build 5 Skynet Telescopes in Australia	*2010*
PI	**Hanover College Richter Grant,** Observe and Record the 1998 Solar Eclipse	*1998*

Service

Member	**American Astronomical Society,** Chambliss Judge	*2010-Current*
Associate Editor	**Frontiers in Astronomy and Space Sciences,** Exoplanets	*2020–Current*
Member	**Exoplanet Exploration Program Analysis Group (ExoPAG),** Exoplanetary System Demographics Group	*2018-Current*
Author	**The Kepler & K2 Missions,** book led by Steve Howell, proceeds go to chairty	*2019-Current*
Public Talk	**Dublin Mountain Partnership,** Exploring New Words in your Cosmic Neighborhood	*2019*
Classroom Visit	**Rogers Forge Children's Center,** Exoplanets for Preschoolers	*2019*
Public Talk	**San Francisco Amateur Astronomers,** When Binary Stars get Funky	*2016*
Workshop	**American Association of Physics Teachers Meeting,** Using Kepler Data in the Classroom	*2013, 2016*
Co-instructor	**Edna Mahn Correctional Facility for Women,** College-Level Mathematics	*2009–2010*

Mentoring

Jafr-Tayar Shabazz	**NAC Undergraduate Intern, STScI,** Citizen science search for stellar flares	*2019*
Daria Cara	**High School Intern, STScI,** Develop search of K2 data with new search algorithm.	*2019*
Veselin Kostov	**Postdoctoral Researcher, GSFC,** Discovery and vetting of exoplanets with K2	*2018*
Miles Currie	**Research for Undergraduates Intern, SETI Institute,** Develop detrending algorithm for K2	*2016*
Mara Zimmerman	**Research for Undergraduates Intern, SETI Institute,** Circularization of heartbeat stars	*2015*

Invited Presentations

TESS Science Conference I, Boston, MA, Invited Panel Member on TESS Data Analysis, 2019

University of Delaware, Dept. of Physics, Colloquium, 2019

TESS Town Hall at the AAS, Seattle, WA, Closing Speaker, 2019

TASC 4 / KASC 11 Workshop, Denmark, Invited Talk, 2018

Villanova University, Dept. of Physics and Astronomy, Colloquium, 2018

American Geophysical Union Special Session on Exoplanets, New Orleans, 2017, Invited Talk, 2017

Kepler Science Conference IV, Mountain View, CA, Invited Talk, 2017

SETI Institute Lecture, Mountain View, CA, Invited Talk, 2015

Technical Skills

Software Development Tools: Python, Matlab, Perl, git, svn

Science Tools: AstroPy, Astroquery, DS9, Period04, Lightkurve, Wqed

Amazon Web Services: Lambda, EC2, S3

Communication Tools: Latex, HTML, Markdown, Jahia, MS Office

Publications

I have published under the names *S. E. Thompson* and *S. E. Mullally*. I am first author on 9 refereed publications. I have an h-index of 35 and i10-index of 60. A full list of publications where I am an author can also be found in an ADS Library from the following link
`https://tinyurl.com/susanemullallylibrary`

Z. Bognár et al., 2020. "TESS first look at evolved compact pulsators. Known ZZ Ceti stars of the southern ecliptic hemisphere as seen by TESS." , 638:A82.

S. Bryson et al., 2020. "A Probabilistic Approach to Kepler Completeness and Reliability for Exoplanet Occurrence Rates." Astrophysical Journal, 159:279.

A. Vanderburg et al., 2020. "A Habitable-zone Earth-sized Planet Rescued from False Positive Status." Astrophysical J. Letters, 893:L27.

C. J. Burke et al., 2019. "Re-evaluating Small Long-period Confirmed Planets from Kepler." Astrophysical Journal, 157:143.

D. Huber et al., 2019. "A Hot Saturn Orbiting an Oscillating Late Subgiant Discovered by TESS." Astrophysical Journal, 157:245.

V. B. Kostov et al., 2019a. "Discovery and Vetting of Exoplanets. I. Benchmarking K2 Vetting Tools." Astrophysical Journal, 157:124.

V. B. Kostov et al., 2019b. "The L 98-59 System: Three Transiting, Terrestrial-size Planets Orbiting a Nearby M Dwarf." Astrophysical Journal, 158:32.

S. E. Mullally, D. R. Rodriguez, K. B. Stevenson & H. R. Wakeford, 2019. "The Exo.MAST Table for JWST Exoplanet Atmosphere Observability." Research Notes of the American Astronomical Society, 3:193.

K. G. Stassun et al., 2019. "The Revised TESS Input Catalog and Candidate Target List." Astrophysical Journal, 158:138.

W. Borucki, S. E. Thompson, E. Agol & C. Hedges, 2018. "Kepler-62f: Kepler's first small planet in the habitable zone, but is it real?" New Astronomy Reviews, 83:28.

K. Hambleton et al., 2018. "KIC 8164262: a heartbeat star showing tidally induced pulsations with resonant locking." Monthly Notices of the Royal Astronomical Society, 473:5165.

F. Mullally et al., 2018. "Kepler's Earth-like Planets Should Not Be Confirmed without Independent Detection: The Case of Kepler-452b." Astrophysical Journal, 155:210.

S. E. Thompson et al., 2018. "Planetary Candidates Observed by Kepler. VIII. A Fully Automated Catalog with Measured Completeness and Reliability Based on Data Release 25." Astrophysical J. Suppl., 235:38.

J. L. Christiansen et al., 2017. "Three's Company: An Additional Non-transiting Super-Earth in the Bright HD 3167 System, and Masses for All Three Planets." Astrophysical Journal, 154:122.

J. Fuller et al., 2017. "Accelerated tidal circularization via resonance locking in KIC 8164262." Monthly Notices of the Royal Astronomical Society, 472:L25.

M. K. Zimmerman et al., 2017. "The Pseudosynchronization of Binary Stars Undergoing Strong Tidal Interactions." Astrophysical J., 846:147.

J. L. Christiansen et al., 2016. "Measuring Transit Signal Recovery in the Kepler Pipeline. III. Completeness of the Q1-Q17 DR24 Planet Candidate Catalogue with Important Caveats for Occurrence Rate Calculations." Astrophysical J., 828:99.

J. L. Coughlin et al., 2016. "Planetary Candidates Observed by Kepler. VII. The First Fully Uniform Catalog Based on the Entire 48-month Data Set (Q1-Q17 DR24)." Astrophysical J. Suppl., 224:12.

K. Hambleton et al., 2016. "KIC 3749404: a heartbeat star with rapid apsidal advance indicative of a tertiary component." Monthly Notices of the Royal Astronomical Society, 463:1199.

D. Huber et al., 2016. "The K2 Ecliptic Plane Input Catalog (EPIC) and Stellar Classifications of 138,600 Targets in Campaigns 1-8." Astrophysical J. Suppl., 224:2.

B. Kirk et al., 2016. "Kepler Eclipsing Binary Stars. VII. The Catalog of Eclipsing Binaries Found in the Entire Kepler Data Set." Astrophysical Journal, 151:68.

F. Mullally et al., 2016. "Identifying False Alarms in the Kepler Planet Candidate Catalog." PASP, 128:074502.

A. Shporer et al., 2016. "Radial Velocity Monitoring of Kepler Heartbeat Stars." Astrophysical J., 829:34.

S. E. Thompson, 2016. "Data Validation Time Series File: Description of File Format and Content." Tech. rep.

S. E. Thompson, D. Fraquelli, J. E. Van Cleve & D. A. Caldwell, 2016a. "Kepler Archive Manual." Tech. rep.

S. E. Thompson et al., 2016b. "Kepler Data Release 25 Notes." Tech. rep.

J. D. Twicken et al., 2016. "Detection of Potential Transit Signals in 17 Quarters of Kepler Data: Results of the Final Kepler Mission Transiting Planet Search (DR25)." Astrophysical Journal, 152:158.

J. E. Van Cleve et al., 2016. "That's How We Roll: The NASA K2 Mission Science Products and Their Performance Metrics." PASP, 128:075002.

C. J. Burke et al., 2015. "Terrestrial Planet Occurrence Rates for the Kepler GK Dwarf Sample." Astrophysical J., 809:8.

J. L. Christiansen et al., 2015. "Measuring Transit Signal Recovery in the Kepler Pipeline II: Detection Efficiency as Calculated in One Year of Data." Astrophysical J., 810:95.

F. Mullally et al., 2015. "Planetary Candidates Observed by Kepler. VI. Planet Sample from Q1–Q16 (47 Months)." Astrophysical J. Suppl., 217:31.

J. F. Rowe et al., 2015. "Planetary Candidates Observed by Kepler. V. Planet Sample from Q1-Q12 (36 Months)." Astrophysical J. Suppl., 217:16.

S. E. Thompson et al., 2015. "A Machine Learning Technique to Identify Transit Shaped Signals." Astrophysical J., 812:46.

C. J. Burke et al., 2014. "Planetary Candidates Observed by Kepler IV: Planet Sample from Q1-Q8 (22 Months)." Astrophysical J. Suppl., 210:19.

J. L. Coughlin et al., 2014. "Contamination in the Kepler Field. Identification of 685 KOIs as False Positives via Ephemeris Matching Based on Q1-Q12 Data." Astrophysical Journal, 147:119.

G. W. Marcy et al., 2014. "Masses, Radii, and Orbits of Small Kepler Planets: The Transition from Gaseous to Rocky Planets." Astrophysical J. Suppl., 210:20.

J. F. Rowe et al., 2014. "Validation of Kepler's Multiple Planet Candidates. III. Light Curve Analysis and Announcement of Hundreds of New Multi-planet Systems." Astrophysical J., 784:45.

P. Tenenbaum et al., 2014. "Detection of Potential Transit Signals in 16 Quarters of Kepler Mission Data." Astrophysical J. Suppl., 211:6.

C. Badenes et al., 2013. "SDSS 1355+0856: a detached white dwarf + M star binary in the period gap discovered by the SWARMS survey." Monthly Notices of the Royal Astronomical Society, 429:3596.

T. Barclay et al., 2013a. "A Super-Earth-sized Planet Orbiting in or Near the Habitable Zone around a Sun-like Star." Astrophysical J., 768:101.

T. Barclay et al., 2013b. "A sub-Mercury-sized exoplanet." Nature, 494:452.

N. M. Batalha et al., 2013. "Planetary Candidates Observed by Kepler. III. Analysis of the First 16 Months of Data." Astrophysical J. Suppl., 204:24.

W. J. Borucki et al., 2013. "Kepler-62: A Five-Planet System with Planets of 1.4 and 1.6 Earth Radii in the Habitable Zone." Science, 340:587.

R. L. Gilliland et al., 2013. "Kepler-68: Three Planets, One with a Density between that of Earth and Ice Giants." Astrophysical J., 766:40.

D. Huber et al., 2013. "Fundamental Properties of Kepler Planet-candidate Host Stars using Asteroseismology." Astrophysical J., 767:127.

A. S. Mukadam et al., 2013. "Measuring the Evolutionary Rate of Cooling of ZZ Ceti." Astrophysical J., 771:17.

E. V. Quintana et al., 2013. "Confirmation of Hot Jupiter Kepler-41b via Phase Curve Analysis." Astrophysical J., 767:137.

P. Tenenbaum et al., 2013. "Detection of Potential Transit Signals in the First 12 Quarters of Kepler Mission Data." Astrophysical J. Suppl., 206:5.

G. Anglada-Escudé et al., 2012. "A Planetary System around the nearby M Dwarf GJ 667C with At Least One Super-Earth in Its Habitable Zone." Astrophysical J. Letters, 751:L16.

W. J. Borucki et al., 2012. "Kepler-22b: A 2.4 Earth-radius Planet in the Habitable Zone of a Sun-like Star." Astrophysical J., 745:120.

E. B. Ford et al., 2012. "Transit Timing Observations from Kepler. II. Confirmation of Two Multiplanet Systems via a Non-parametric Correlation Analysis." Astrophysical J., 750:113.

A. W. Howard et al., 2012. "Planet Occurrence within 0.25 AU of Solar-type Stars from Kepler." Astrophysical J. Suppl., 201:15.

J. L. Provencal et al., 2012. "Empirical Determination of Convection Parameters in White Dwarfs. I. Whole Earth Telescope Observations of EC14012-1446." Astrophysical J., 751:91.

S. E. Thompson et al., 2012. "A Class of Eccentric Binaries with Dynamic Tidal Distortions Discovered with Kepler." Astrophysical J., 753:86.

M. Endl et al., 2011. "Kepler-15b: A Hot Jupiter Enriched in Heavy Elements and the First Kepler Mission Planet Confirmed with the Hobby-Eberly Telescope." Astrophysical J. Suppl., 197:13.

M. Redaelli et al., 2011. "The pulsations of PG 1351+489." Monthly Notices of the Royal Astronomical Society, 415:1220.

R. Rosen, M. A. McLaughlin & S. E. Thompson, 2011. "A Non-radial Oscillation Model for Pulsar State Switching." Astrophysical J. Letters, 728:L19.

R. W. Slawson et al., 2011. "Kepler Eclipsing Binary Stars. II. 2165 Eclipsing Binaries in the Second Data Release." Astrophysical Journal, 142:160.

M. H. Montgomery et al., 2010. "Evidence for Temperature Change and Oblique Pulsation from Light Curve Fits of the Pulsating White Dwarf GD 358." Astrophysical J., 716:84.

S. E. Thompson et al., 2010. "Pulsational Mapping of Calcium Across the Surface of a White Dwarf." Astrophysical J., 714:296.

C. Badenes, F. Mullally, S. E. Thompson & R. H. Lupton, 2009. "First Results from the SWARMS Survey. SDSS 1257+5428: A Nearby, Massive White Dwarf Binary with a Likely Neutron Star or Black Hole Companion." Astrophysical J., 707:971.

F. Mullally, C. Badenes, S. E. Thompson & R. Lupton, 2009. "Twins: The Two Shortest Period Non-Interacting Double Degenerate White Dwarf Stars." Astrophysical J. Letters, 707:L51.

A. Nitta et al., 2009. "New Pulsating DB White Dwarf Stars from the Sloan Digital Sky Survey." Astrophysical J., 690:560.

J. L. Provencal et al., 2009. "2006 Whole Earth Telescope Observations of GD358: A New Look at the Prototype DBV." Astrophysical J., 693:564.

M. H. Montgomery, S. E. Thompson & T. von Hippel, 2008. "Constraining the Surface Inhomogeneity and Settling Times of Metals on Accreting White Dwarfs." Astrophysical J. Letters, 685:L133.

F. Mullally et al., 2008. "Limits on Planets around Pulsating White Dwarf Stars." Astrophysical J., 676:573.

S. E. Thompson, 2008. "On Coordinating Time Series Spectroscopy with the WET." Communications in Asteroseismology, 154:50.

S. E. Thompson, M. H. van Kerkwijk & J. C. Clemens, 2008. "Deciphering the pulsations of G 29-38 with optical time series spectroscopy." Monthly Notices of the Royal Astronomical Society, 389:93.

D. E. Mkrtichian et al., 2007. "Multimode Pulsations of the λ Bootis Star 29 Cygni: The 1995 and 1996 Multisite Campaigns." Astrophysical Journal, 134:1713.

A. Nitta et al., 2007. "Doubling the number of DBVs and a closer look at their Instability Strip." Communications in Asteroseismology, 150:249.

T. von Hippel & S. E. Thompson, 2007. "Discovery of Photospheric Calcium Line-Strength Variations in the DAZd White Dwarf G29-38." Astrophysical J., 661:477.

F. Mullally et al., 2005. "Eleven New DA White Dwarf Variable Stars from the Sloan Digital Sky Survey." Astrophysical J., 625:966.

C. M. Yeates, J. C. Clemens, S. E. Thompson & F. Mullally, 2005. "Mode Identification from Combination Frequency Amplitudes in ZZ Ceti Stars." Astrophysical J., 635:1239.

A. S. Mukadam et al., 2004. "Thirty-Five New Pulsating DA White Dwarf Stars." Astrophysical J., 607:982.

S. E. Thompson, 2004. *Revelations from time series spectroscopy of pulsating white dwarf stars*. Ph.D. thesis, THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL.

S. E. Thompson et al., 2004. "The Peculiar Pulsations of PY Vulpeculae." Astrophysical J., 610:1001.

S. E. Thompson, J. C. Clemens, M. H. van Kerkwijk & D. Koester, 2003. "High-Resolution Spectroscopy of the Pulsating White Dwarf G29-38." Astrophysical J., 589:921.