

# Peter S. Ferguson | CV

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## RESEARCH INTERESTS

Near Field Cosmology  
Variable Stars

Milky Way (Sub)structure  
Large Scale Surveys

Dark Matter  
Instrumentation

Tidal Streams  
Spatial Statistics

## EDUCATION

**Ph.D. in Astrophysics**

*Expected August 2021*

**M.S. in Astrophysics**

2019

Texas A&M University

Science: Jennifer Marshall & Louis Strigari

Instrumentation: Darren DePoy

**B.S. in Astrophysics**

2013

Haverford College

## APPOINTMENTS

2020-2021	Universities Research Association (URA) Visiting Scholar	Fermilab
2018-Present	Graduate Research Assistant: Astronomy	Texas A&M
2018-Present	Graduate Research Assistant: Instrumentation	Texas A&M
2016-2018	Graduate Teaching Assistant: Astro-lab Coordinator/Instructor	Texas A&M
2015	Research Assistant with Kristin Chiboucas	Gemini Obs. North

## Publications

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### First & Co-Author

A. Drlica-Wagner, J. L. Carlin, D. L. Nidever, **P. S. Ferguson** et. al., *The DECam Local Volume Exploration Survey: Overview and First Data Release*, 2021, Submitted to AAS Journals [arXiv:2103.07476](#)

**P.S. Ferguson**, L.E. Strigari, *Exploring the 3D structure of the Sagittarius dSph using RR-Lyrae*, 2020, **MNRAS**, **495**, 4

### Contributing Author

K. M. Stringer, A. Drlica-Wagner, L. Macri, ... **P. S. Ferguson**, et. al., *Identifying RR Lyrae Variable Stars in Six Years of the Dark Energy Survey*, 2021, Submitted to AAS Journals, [arXiv:2011.13930](#)

W. Cerny, A. B. Pace, A. Drlica-Wagner, **P. S. Ferguson**, et. al., *Discovery of an Ultra-Faint Stellar System near the Magellanic Clouds with the DECam Local Volume Exploration (DELVE) Survey*, 2021, **ApJ**, **910**, 18

T. T. Hansen, A. H. Riley, L. E. Strigari, J. L. Marshall, **P. S. Ferguson**, J. Zepeda, and C. Sneden, *A Chemo-dynamical Link between the Gjöll Stream and NGC 3201*, 2020, **ApJ**, **901**, 23

- T. T. Hansen, J. L. Marshall, J. D. Simon, ..., **P. S. Ferguson**, et. al., *Chemical Analysis of the Ultra-Faint Dwarf Galaxy Grus II. Signature of high-mass stellar nucleosynthesis*, 2020, **ApJ**, **897**, **183**
- S. Mau, W. Cerny, A. B. Pace, ..., **P. S. Ferguson**, et.al., *Two Ultra-Faint Milky Way Stellar Systems Discovered in Early Data from the DECam Local Volume Exploration Survey*, 2020, **ApJ**, **890**, **136**
- K. M. Stringer, J. P. Long, L. M. Macri, ..., **P. S. Ferguson**, et.al., *Identification of RR Lyrae stars in multiband, sparsely-sampled data from the Dark Energy Survey using template fitting and Random Forest classification*, 2019, **AJ**, **158**, **16**
- N. Shipp, A. Drlica-Wagner, E. Balbinot, **P. Ferguson**, et. al., *Stellar Streams Discovered in the Dark Energy Survey*, 2018, **ApJ**, **862**, **114**

## Conference proceedings.....

- P. S. Ferguson**, L. Barba, D. L. DePoy, L. M. Schmidt, J. L. Marshall, et. al., *Further development and testing of TCal: a mobile spectrophotometric calibration unit for astronomical imaging systems*. 2020, **Proceedings of the SPIE**, **Volume 11447**
- P. S. Ferguson**, D. L. DePoy, L. Schmidt, J. L. Marshall, et. al., *Development of TCal: a mobile spectrophotometric calibration unit for astronomical imaging systems*, 2018, **Proceedings of the SPIE**, **Volume 107023A**

## Talks/Posters

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### Invited.....

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| 2021 | "The Messy Side of the Milky Way: using large surveys to explore our Galaxy's halo" |      |
|      | Texas A&M University Joint Nuclear and Astrophysics Seminar                         | Talk |
| 2020 | "Stellar Streams in DELVE"  |      |
|      | DECam Local Volume Exploration (DELVE) Survey Collaboration Meeting                 | Talk |
| 2020 | "Milky Way working group activities"  |      |
|      | Dark Energy Survey(DES) Collaboration Meeting                                       | Talk |

### Contributed.....

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|------|---|--------|
| 2021 | "The Jet stream in DELVE"   |        |
|      | Texas Section of the American Physical Society (TSAPS), virtual   | Talk   |
| 2021 | "The Jet stream in DELVE"   |        |
|      | Streams21: Constraints on Dark Matter, Virtual  | Talk   |
| 2020 | "Further development and testing of TCal: a mobile spectrophotometric calibration unit for astronomical imaging systems", SPIE Astronomical Telescopes + Instrumentation, Virtual | Poster |
| 2019 | "Exploring the 3D structure of the Sagittarius dSph core using RR Lyrae"  |        |
|      | RRL/Cepheid, Cloudcroft, NM   | Talk   |
| 2019 | "Constraining the 3D structure of the Sagittarius dwarf galaxy using RR-Lyrae and simple hierarchical Bayesian modeling" Workshop on Astronomy & Statistics, Texas A&M University | Talk   |
| 2018 | "RR-Lyrae in the Dark Energy Survey", Near-Field Cosmology with the Dark Energy Survey's DR1 and Beyond, Kavali Institute for Cosmological Physics, University of Chicago         | Talk   |
| 2018 | "TCal: a mobile spectrophotometric calibration unit for astronomical imaging systems"   |        |
|      | SPIE Astronomical Telescopes + Instrumentation, Austin, Tx.   | Poster |

2017 “K2F2: Two new medium K-band filters on FLAMINGOS-2 at Gemini South”

Frank N. Bash Symposium, The University of Texas at Austin

Poster

## SCIENTIFIC COLLABORATIONS

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- 2018-present *DECam Local Volume Exploration (DELVE) Survey* [<https://delve-survey.github.io>]  
*Builder:* DELVE is a 3-year survey combining archival DECam data with 126 nights of dedicated observing. This survey looks to probe the small scale nature of dark matter by (1) searching for ultra faint MW satellites and stellar streams, (2) studying the satellite population and star formation history around the Large and Small Magellanic Clouds, and (3) deeply imaging around isolated Large Magellanic Cloud analogs to determine their satellite luminosity function. I have contributed to much of the calibration pipeline, data validation, and morphological classifier for our first data release DELVE-DR1 in early 2021.
- 2016-present *Dark Energy Survey (DES)* [<https://www.darkenergysurvey.org>]  
*Member of Milky Way working group:* DES is a photometric survey over 5,000 deg in *griz*-bands to a depth of 24th mag. I have contributed to validation of DES catalogs, and analyses looking for dwarf galaxies, stellar streams, and RR Lyrae in the DES datasets.
- 2020-present *Southern Stellar Stream Spectroscopic Survey ( $S^5$ )* [<https://s5collab.github.io/>]  
*Member:*  $S^5$  is a spectroscopic survey run out of AAT to obtain spectra of stellar streams discovered in DES. I have contributed to target selection and determining stream membership probability of stars with 6D kinematic observations.

## PROPOSALS

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Below are the successful observing proposals I have been the PI for.

- 2019 *Probing the Dynamical Structure of Sagittarius*  
VLT/FLAMES cycle 105 (0.5 nights observations pushed to 2021 due to COVID)
- 2019 *Probing the Dynamical Structure of Sagittarius*  
Gemini south 2020A (18 hours observations not taken due to COVID)

## OBSERVING EXPERIENCE

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<b>Cerro Tololo Interr-American Observatory</b> Chile – Blanco 4-meter telescope Used DECam both in person and remotely	14 nights
<b>McDonald Observatory</b> TX, USA – Harlan Smith 2.7-meter telescope Used Tull coudé Echelle Spectrograph for R-Process Alliance Observing	20 nights
<b>Gemini South:</b> Chile – 8-meter telescope Commissioned 2 new filters on FLAMINGOS-2	3 nights
<b>Gemini North:</b> HI, USA – 8-meter telescope Operated Queue as part of work at Gemini	3 nights

## AWARDS

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- 2021 Spring TSAPS outstanding talk by a graduate student
- 2020 Fall TSAPS outstanding talk by a graduate student
- 2020 URA Visiting Scholar at Fermilab award (Sponsor: Alex Drlica-Wagner)

## MENTORING

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- 2020-present Kiyon Tavanagar: Mr. Tavanagar, an astrophysics major at University of Chicago, has worked on characterizing stellar streams found in DES.
- 2018-present Leo Barba: Mr. Barba, a physics major at Texas A&M, has worked 3D printing and designing parts for TCal as well as helping to set up and run the instrument.
- 2018 Sarah Hughes: Ms. Hughes, an REU student at Texas A&M, helped to design the LabView based software used to run TCal.