

Benjamin J. Gibson

University of Utah Department of Physics and Astronomy

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[benjamin-gibson.github.io](https://github.com/benjamin-gibson)

Research Interests Measuring the kinematics, star formation history, and chemical evolution of the stellar populations in external galaxies using high resolution integrated light spectroscopy and deep resolved stellar photometry. This work will help bridge the divide between Milky Way and extragalactic astronomy, and better inform our models of galaxy formation and evolution.

Education *PhD in Physics, Astrophysics Track* 2021 - Present
University of Utah, Salt Lake City, UT.
Advised by **Dr. Gail Zasowski** and **Dr. Anil Seth**

MS in Physics 2019 - 2021
University of Utah, Salt Lake City, UT.

BS in Physics, Minor in Mathematics 2015 - 2019
Florida State University, Tallahassee, FL.

Research Experience *The Chemodynamics of the Stellar Populations in M31 from APOGEE Integrated Light Spectroscopy* 2019 - Present
University of Utah

- Analyzed near-infrared integrated light spectra of the inner ~ 7 kpc of M31 from APOGEE.
- Reduced data to optimize for integrated light and spatially binned to increase SNR.
- Used machine learning to interpolate between simple stellar population model spectra.
- Developed new software to perform full spectrum fitting.

The APOGEE Survey: High-resolution IR integrated-light spectroscopy of M33 Cluster System 2023 - Present
University of Utah

- Analyzed APOGEE spectra of globular clusters in M33 to gain insight on the origin of the clusters and the assembly history of M33.
- Used visual, spectroscopic, and photometric techniques to classify observations as clusters or not.

Fellowships and Awards *Eccles Astronomy Research Award* - \$5000 2023
University of Utah - *Department of Physics and Astronomy*

Swigart Graduate Research Fellowship - \$6000 2020
University of Utah - *Department of Physics and Astronomy*

Outstanding Graduate Student Award - \$400 2020
University of Utah - *Department of Physics and Astronomy*

Eagle Scout Rank 2014
Boy Scouts of America, Mecklenburg County Council

First Author Publications **Gibson, Benjamin J.**; Zasowski, Gail; Seth, Anil; ...; et al., 2024 *submitted, Towards Understanding the Milky Way's Typicality: Assessing the Chemodynamics of M31's Bulge & Bar, Thick & Thin discs*, MNRAS

Gibson, Benjamin J.; Zasowski, Gail; Seth, Anil; ...; et al., 2023, *The Chemodynamics of the Stellar Populations in M31 from APOGEE Integrated Light Spectroscopy*, *Astrophysical Journal*, 952, 23 (arXiv:2304.09901)

Other Publications Alondra Álvarez-Castro, **Benjamin J. Gibson**, and Gail Zasowski, 2024, *Measuring the Chemodynamics and Ages of the M32 and M110 Dwarf Galaxies with APOGEE*, *Research Notes of the AAS*, 8, 112

Wainer, Tobin M.; Zasowski, Gail; ...; **Gibson, Benjamin J.**; et al., 2023, *Catalog of Integrated-light Star Cluster Light Curves in TESS*, *Astronomical Journal*, 166, 106 (arXiv:2307.09510)

Dey, Arjun; ...; **Gibson, Benjamin J.**; ...; et al., 2023, *RomAndromeda: The Roman Survey of the Andromeda Halo*, (arXiv:2306.12302)

Abdurro'uf; ...; **Gibson, Benjamin J.**; ...; et al., 2022, *The Seventeenth Data Release of the Sloan Digital Sky Surveys: Complete Release of MaNGA, MaStar, and APOGEE-2 Data*, *Astrophys J Suppl Ser*, 259, 35 (arXiv:2112.02026)

Invited Talks ***Harnessing the Power of High-Resolution Integrated Light Spectroscopy from APOGEE*** 2025
Carnegie Observatories Lunch Seminar
Carnegie Observatories, Pasadena, CA

Harnessing the Power of High-Resolution Integrated Light Spectroscopy from APOGEE 2024
Tuesday UVa / NRAO Astronomy (TUNA) Lunch Talks
University of Virginia, Charlottesville, VA

Harnessing the Power of High-Resolution Integrated Light Spectroscopy from APOGEE 2024
Galaxy and AGN Journal Club
Space Telescope Science Institute, Baltimore, MD

Presentations ***Harnessing the Power of High-Resolution Integrated Light Spectroscopy*** 2024
245th AAS Meeting - Dissertation Talk
National Harbor, MD

- Characterizing Kinematically Distinct Stellar Populations in M31
from APOGEE Integrated Light Spectroscopy*** 2024
SDSS-V Collaboration Meeting - Contributed Talk
New Mexico State University, Las Cruces, NM
- Characterizing Kinematically Distinct Stellar Populations in M31
from Integrated Light Spectroscopy*** 2023
A Life Devoted to Stellar Populations - Contributed Talk
Puerto de la Cruz, Tenerife, Spain
- The Chemodynamics of the Stellar Populations in M31*** 2023
SDSS Milky Way As a Galaxy Telecon - Research Update
- The Chemodynamics of the Stellar Populations in M31*** 2023
Annual Physics & Astronomy Research Symposium
University of Utah, Salt Lake City, UT
- The Milky Way and M31*** - Discussion Leader 2023
Wide Field Spectroscopy vs. Galaxy Formation Theory
Biosphere 2.0, Tucson, AZ
- Untangling the Chemodynamics of the Stellar Populations in M31*** 2022
Linking the Galactic and Extragalactic - Contributed Talk
Wollongong, NSW, Australia
- Untangling the Chemodynamics of the Stellar Populations in M31*** 2022
AAS 240 Summer Meeting
Pasadena, CA
- Untangling the Chemodynamics of the Stellar Populations in M31*** 2022
Annual Physics & Astronomy Research Symposium
University of Utah, Salt Lake City, UT
- Untangling the Chemodynamics of the Stellar Populations in M31
with APOGEE*** 2022
SDSS Milky Way As a Galaxy Telecon - Research Update
- An Infrared Mapping of the Interior of M31*** 2021
Annual Physics & Astronomy Research Symposium
University of Utah, Salt Lake City, UT
- Chemodynamics from Integrated Light Spectroscopy*** 2021
The SDSS Collaboration Meeting 2021 - Lightning Talk
Hosted by Johns Hopkins University, Baltimore, MD
- An Infrared Mapping of the Interior of M31*** 2020
Swigart Summer Research Symposium
University of Utah, Salt Lake City, UT
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Teaching and Mentoring Experience	<p>REU Mentor 2023 - Present University of Utah - <i>Department of Physics and Astronomy</i></p> <ul style="list-style-type: none"> - Instructed an undergraduate student from Puerto Rico in recreating my APOGEE integrated light spectral analysis code. Applied it to spectra of the center of M32 and M110 and interpreted it within the context of published literature. - Project resulted in a poster presented at AAS #243, Jan. 2024 and a AAS Research Note, Apr. 2024 <p>Graduate Teaching Assistant Aug. 2019 - Dec. 2020 University of Utah - <i>Department of Physics and Astronomy</i></p> <ul style="list-style-type: none"> - Fall 2020: Observational Astronomy, Physics II Lab for Scientists and Engineers - Spring 2020: General Physics II - Fall 2019: Observational Astronomy, The Solar System
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Service	<p>Graduate Student Advisory Committee, Member 2020 - Present Graduate Student Advisory Committee, Chair & Chair-Elect 2022 - 2024 Physics Graduate Social Committee, Chair 2020 - 2022 Physics Graduate Social Committee, Member 2019 - 2024 Recruitment and Admissions Committee, Member 2021 - 2022 Physics Graduate Peer Mentor Program, Mentor 2020 - 2024 University of Utah - <i>Department of Physics and Astronomy</i></p> <p>Graduate and Professional Student Council, Historian 2023 - Present University of Utah</p>
Outreach Presentations	<p>What does the Night Sky Really Look Like? 2022 Presented five times at various astronomy clubs and churches, as well as Astronomy on Tap Salt Lake City.</p>
Professional Memberships	<p>American Astronomical Society, Grad Student Member 2021 - Present Sloan Digital Sky Survey V 2021 - Present Sloan Digital Sky Survey IV 2020 - Present</p>
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Skills	<p>Programming Languages: Python, Matlab, LaTeX Astronomy Software: astropy, pPXF, <i>The Cannon</i>, emcee, matplotlib, Aladin Analysis Methods: Full Spectrum Fitting, MCMC, Stellar Population Synthesis, CMD Analysis, Regression, Bootstrap Sampling, Classification, Jackknife Resampling, LOESS smoothing Other: Unix, German</p>
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References

Dr. Gail Zasowski, Associate Professor, University of Utah
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Dr. Anil Seth, Professor, University of Utah
aseth@astro.utah.edu

Dr. Sten Hasselquist, Senior Staff Scientist, Space Telescope Science Institute
shasselquist@stsci.edu

Dr. Julianne Dalcanton, Director, Center for Computational Astrophysics
jldalcanton@flatironinstitute.org

Dr. David Nidever, Assistant Professor, Montana State University
david.nidever@montana.edu

Dr. Borja Anguiano, Ramon y Cajal Fellow, Centro de Estudios de Física del
Cosmos de Aragon
astrobaj@gmail.com