Brett H. Andrews

Curriculum Vitae

andrewsb@pitt.edu bretthandrews.github.io bretthandrews

Experience

Research Associate Professor 2022–present
Department of Physics and Astronomy, University of Pittsburgh

Research Assistant Professor 2017–2022
Department of Physics and Astronomy, University of Pittsburgh

Postdoctoral Associate 2014–2017
Department of Physics and Astronomy, University of Pittsburgh

Education

Ph.D. Astronomy 2014
The Ohio State University
"Decoding Galaxy Evolution with Gas-phase and Stellar Elemental Abundances"
Advisors: David H. Weinberg & Jennifer A. Johnson

M.S. Astronomy 2011
The Ohio State University

B.S. Physics & Astronomy 2008
Yale University
Nicolas Adamo Scholar-Athlete Prize (Silliman College)

Publications

4 lead author; 10 significant contributing author; 56 contributing author; 3 additional publications. List attached.

Presentations

4 invited; 28 contributed; 2 posters. List attached.

Funding

PI: NSF Astronomy and Astrophysics Research Grants 2020–present
Interpretable and Deblended Photometric Redshifts with a Deep Capsule Network
$535,578

Co-I: NASA Astrophysical Data Analysis Program 2019–present
Multiwavelength Milky Way Analogs
$504,949

Co-I: NASA Astrophysical Data Analysis Program (Funded Extension) 2021
Multiwavelength Milky Way Analogs
$33,707

Senior Personnel: NSF Major Research Instrumentation Program 2021–2024
Acquisition of Cutting-Edge GPU and MPI Nodes for the Interdisciplinary Pitt Center for Research Computing
$1,187,606

Software	**`flexCE`** Python package for modeling galactic chemical evolution.	
	`Marvin` Python package, RESTful API, and Flask web application for accessing, visualizing, and analyzing SDSS-IV MaNGA integral-field spectroscopic data.	
Mentoring Ph.D.	**Biprateep Dey** (University of Pittsburgh) "Estimating Photometric Redshifts with Deep Neural Networks"	2018–present
	Ashod Khederlarian (University of Pittsburgh) "Data-driven Implementation of Emission Lines in Mock Galaxy Surveys for Improving Photo-z Predictions"	2022–present
	Yoquelbin Salcedo Hernandez (University of Pittsburgh) "DESI-2 Emission Line Galaxy Target Selection"	2022–present
	Troy Raen (University of Pittsburgh) "Toward the Study of Stars with LSST"	2019–2022
	Catherine Fielder (University of Pittsburgh) "Constraining the Milky Way's Ultraviolet to Infrared SED"	2018–2022
M.S.	**Quanbin (Eric) Ma** (Carnegie Mellon University Machine Learning Department) "Deep Dimensionality Reduction of MaNGA Data"	2017
Undergraduate	**Zach Lewis** (University of Pittsburgh) "The Gas-Phase Mass-Metallicity Relation for Massive Galaxies at $z \sim 0.7$ with the LEGA-C Survey "	2019–2022
	Katie Mack (University of Pittsburgh) "Comparing Stellar and Emission Line Dust Attenuation in the LEGA-C Survey"	2021–2022
	Ian Cooper (University of Pittsburgh) "SNIa Hosts in MaNGA"	2016
High School	**Mariah Jones** (Baldwin High School) "The Mass–Metallicity Relation at Intermediate Redshifts"	2020–2021
Teaching & Tutorials	**AstroPGH Python Boot Camp and Summer Seminar Series** (University of Pittsburgh and Carnegie Mellon University)	
	– Organizer. Presented lecture on Python and Jupyter.	2022
	– Organizer. Presented two lectures on Numpy and Pandas.	2021
	– Organizer. Presented eight lectures on Python basics, Astropy, Pandas, Git, and GitHub.	2020
	Data Science Group Meeting (University of Pittsburgh) Organized event series for astrophysics graduate students.	2018
	Marvin Workshops (SDSS-IV Collaboration Meetings) Led introductory workshops for users of the `Marvin` software toolkit.	2015–2017
	Python Boot Camps (University of Pittsburgh) Led events for undergraduate and graduate students.	2015

Outreach	**Astronomy on Tap**	
	"The Origin of the Elements"	2018
	"Indiana Jones and the Hidden Galaxy" w/ Courtney Epstein	2014
	Learn & Earn Corporate Host	2021
	Hosted intern for summer youth employment program delivered by Allegheny County, the City of Pittsburgh, and Partner4Work.	
	Science Olympiad	2011
	Coached Grandview Heights (Ohio) Middle School team.	
Collab.	**LSST Dark Energy Science Collaboration (DESC) Full Member**	2023
	SDSS-IV/MaNGA Architect	2016
Service to Profession	**Invited referee for *ApJ*, *MNRAS*, *A&A*, and *PASP***	
	Invited reviewer for NSF	
	Faculty Hiring Committee	
	Department of Physics and Astronomy, University of Pittsburgh	
	– LSST LINCC Research Assistant Professor	2021–2022, 2022–2023
	– Astrophysics or Experimental High Energy Physics with Machine Learning	2018–2019
	Faculty Peer Buddy	2021–present
	University of Pittsburgh	

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Publications

Lead Author

4. **Andrews, B. H.**, et al., 2017, *The Astrophysical Journal*, 835, 224
   Inflow, Outflow, Yields, and Stellar Population Mixing in Chemical Evolution Models
3. **Andrews, B. H.** & Martini, P., 2013, *The Astrophysical Journal*, 765, 140
   The Mass-Metallicity Relation with the Direct Method on Stacked Spectra of SDSS Galaxies
2. **Andrews, B. H.**, et al., 2012, *Acta Astronomica*, 62, 269
   Principal Component Abundance Analysis of Microlensed Bulge Dwarf and Subgiant Stars
1. **Andrews, B. H.** & Thompson, T. A., 2011, *The Astrophysical Journal*, 727, 97
   Assessing Radiation Pressure as a Feedback Mechanism in Star-forming Galaxies

Sig. Contrib. Author

10. Lewis, Z., **Andrews, B. H.**, et al., 2023, *arXiv:astro-ph/2304.12343*
    The Gas-Phase Mass–Metallicity Relation for Massive Galaxies at $z \sim 0.7$ with the LEGA-C Survey
9. Kodra, D., **Andrews, B. H.**, et al., 2023, *The Astrophysical Journal*, 942, 36
   Optimized Photometric Redshifts for the Cosmic Assembly Near-Infrared Deep Extragalactic Legacy Survey (CANDELS)
8. Fielder, C., **Andrews, B. H.**, et al., 2022, *arXiv:astro-ph/2212.03263*
   Empirically-Driven Multiwavelength K-corrections At Low Redshift
7. Dey, B., **Andrews, B. H.**, et al., 2022, *Monthly Notices of the Royal Astronomical Society*, 515, 4
   Photometric Redshifts from SDSS Images with an Interpretable Deep Capsule Network
6. Dey, B., Zhao, D., Newman, J. A., **Andrews, B. H.**, et al., 2022, *arXiv:stat/2205.14568*
   Calibrated Predictive Distributions via Diagnostics for Conditional Coverage
5. Dey, B., Newman, J. A., **Andrews, B. H.**, et al., 2021, *arXiv:astro-ph/2110.15209*
   Re-calibrating Photometric Redshift Probability Distributions Using Feature-space Regression
4. Fielder, C. E., Newman, J. A., **Andrews, B. H.**, et al., 2021, *Monthly Notices of the Royal Astronomical Society*, 508, 4459
   Constraining the Milky Way's ultraviolet-to-infrared SED with Gaussian process regression
3. Cherinka, B., **Andrews, B. H.**, et al., 2019, *The Astronomical Journal*, 158, 74
   Marvin: A Tool Kit for Streamlined Access and Visualization of the SDSS-IV MaNGA Data Set
2. Weinberg, D. H., **Andrews, B. H.**, & Freudenburg, J., 2017, *The Astrophysical Journal*, 837, 183
   Equilibrium and Sudden Events in Chemical Evolution
1. Brown, J. S., Martini, P., & **Andrews, B. H.**, 2016, *Monthly Notices of the Royal Astronomical Society*, 458, 1529
   A recalibration of strong-line oxygen abundance diagnostics via the direct method and implications for the high-redshift universe

Contributing Author

56. Zhou, S., et al., 2023, *Monthly Notices of the Royal Astronomical Society*, 521, 5810
    Are Milky-Way-like galaxies like the Milky Way? A view from SDSS-IV/MaNGA
55. Setton, D., et al., 2023, *The Astrophysical Journal Letters*, 947, 31
    DESI Survey Validation Spectra Reveal an Increasing Fraction of Recently Quenched Galaxies at $z \sim 1$
54. Kartaltepe, J., et al., 2023, *The Astrophysical Journal Letters*, 946, 15
    CEERS Key Paper. III. The Diversity of Galaxy Structure and Morphology at z = 3–9 with JWST

53. Boardman, N., et al., 2022, *Monthly Notices of the Royal Astronomical Society*, 514, 2298
How well do local relations predict gas-phase metallicity gradients? Results from SDSS-IV MaNGA
52. Oyarzún, G. A., et al., 2022, *The Astrophysical Journal*, 933, 88
SDSS-IV MaNGA: How the Stellar Populations of Passive Central Galaxies Depend on Stellar and Halo Mass
51. Schaefer, A. L., et al., 2022, *The Astrophysical Journal*, 930, 2
SDSS-IV MaNGA: Exploring the Local Scaling Relations for N/O
50. Abdurro'uf, et al., 2021, *The Astrophysical Journal Supplement Series*, 259, 2
The Seventeenth Data Release of the Sloan Digital Sky Surveys: Complete Release of MaNGA, MaStar, and APOGEE-2 Data
49. Law, D., et al., 2020, *The Astrophysical Journal*, 915, 35
SDSS-IV MaNGA: Refining Strong Line Diagnostic Classifications Using Spatially Resolved Gas Dynamics
48. Parikh, T., et al., 2021, *Monthly Notices of the Royal Astronomical Society*, 502, 5508
SDSS-IV MaNGA: radial gradients in stellar population properties of early-type and late-type galaxies
47. Greener, M., et al., 2021, *Monthly Notices of the Royal Astronomical Society*, 502, 95
SDSS-IV MaNGA: the 'G-dwarf problem' revisited
46. Luo, Y., et al., 2021, *The Astrophysical Journal*, 908, 183
Evidence for the Accretion of Gas in Star-forming Galaxies: High N/O Abundances in Regions of Anomalously Low Metallicity
45. Mazzola, C., et al., 2020, *Monthly Notices of the Royal Astronomical Society*, 499, 1607
The close binary fraction as a function of stellar parameters in APOGEE: a strong anticorrelation with α abundances
44. Boardman, N., et al., 2020, *Monthly Notices of the Royal Astronomical Society*, 498, 4943
Are the Milky Way and Andromeda unusual? A comparison with Milky Way and Andromeda analogues
43. Fraser-McKelvie, A., et al., 2020, *Monthly Notices of the Royal Astronomical Society*, 495, 4158
SDSS-IV MaNGA: spatially resolved star formation in barred galaxies
42. Ahumada, R., et al., 2020, *The Astrophysical Journal Supplement Series*, 249, 3
The 16th Data Release of the Sloan Digital Sky Surveys: First Release from the APOGEE-2 Southern Survey and Full Release of eBOSS Spectra
41. Greener, M. J., et al., 2020, *Monthly Notices of the Royal Astronomical Society*, 495, 2305
SDSS-IV MaNGA: spatially resolved dust attenuation in spiral galaxies
40. Schaefer, A. L., et al., 2020, *The Astrophysical Journal*, 890, L3
SDSS-IV MaNGA: Variations in the N/O-O/H Relation Bias Metallicity Gradient Measurements
39. Boardman, N., et al., 2020, *Monthly Notices of the Royal Astronomical Society*, 491, 3672
Milky Way analogues in MaNGA: multiparameter homogeneity and comparison to the Milky Way
38. Westfall, K. B., et al., 2019, *The Astronomical Journal*, 158, 231
The Data Analysis Pipeline for the SDSS-IV MaNGA IFU Galaxy Survey: Overview
37. Fraser-McKelvie, A., et al., 2019, *Monthly Notices of the Royal Astronomical Society*, 488, L6
SDSS-IV MaNGA: stellar population gradients within barred galaxies
36. Pace, Z. J., et al., 2019, *The Astrophysical Journal*, 883, 83
Resolved and Integrated Stellar Masses in the SDSS-IV/MaNGA Survey. II. Applications of PCA-based Stellar Mass Estimates
35. Pace, Z. J., et al., 2019, *The Astrophysical Journal*, 883, 82
Resolved and Integrated Stellar Masses in the SDSS-IV/MaNGA Survey. I. PCA Spectral Fitting and Stellar Mass-to-light Ratio Estimates
34. Zhang, K., et al., 2019, *The Astrophysical Journal*, 883, 63
Machine-learning Classifiers for Intermediate Redshift Emission-line Galaxies
33. Oyarzún, G. A., et al., 2019, *The Astrophysical Journal*, 880, 111
Signatures of Stellar Accretion in MaNGA Early-type Galaxies

32. Parikh, T., et al., 2019, *Monthly Notices of the Royal Astronomical Society*, 483, 3420
SDSS-IV MaNGA: local and global chemical abundance patterns in early-type galaxies
31. Aguado, D. S., et al., 2019, *The Astrophysical Journal Supplement Series*, 240, 23
The Fifteenth Data Release of the Sloan Digital Sky Surveys: First Release of MaNGA-derived Quantities, Data Visualization Tools, and Stellar Library
30. Hwang, H.-C., et al., 2019, *The Astrophysical Journal*, 872, 144
Anomalously Low-metallicity Regions in MaNGA Star-forming Galaxies: Accretion Caught in Action?
29. Li, H., et al., 2019, *The Astrophysical Journal*, 872, 63
Interpreting the Star Formation-Extinction Relation with MaNGA
28. Zasowski, G., et al., 2019, *The Astrophysical Journal*, 870, 138
APOGEE DR14/DR15 Abundances in the Inner Milky Way
27. Rowlands, K., et al., 2018, *Monthly Notices of the Royal Astronomical Society*, 480, 2544
SDSS-IV MaNGA: spatially resolved star formation histories and the connection to galaxy physical properties
26. Parikh, T., et al., 2018, *Monthly Notices of the Royal Astronomical Society*, 477, 3954
SDSS-IV MaNGA: the spatially resolved stellar initial mass function in ∼400 early-type galaxies
25. Penny, S. J., et al., 2018, *Monthly Notices of the Royal Astronomical Society*, 476, 979
SDSS-IV MaNGA: evidence of the importance of AGN feedback in low-mass galaxies
24. Abolfathi, B., et al., 2018, *The Astrophysical Journal Supplement Series*, 235, 42
The Fourteenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the Extended Baryon Oscillation Spectroscopic Survey and from the Second Phase of the Apache Point Observatory Galactic Evolution Experiment
23. Talbot, M. S., et al., 2018, *Monthly Notices of the Royal Astronomical Society*, 477, 195
SDSS-IV MaNGA: the spectroscopic discovery of strongly lensed galaxies
22. Wylezalek, D., et al., 2018, *Monthly Notices of the Royal Astronomical Society*, 474, 1499
SDSS-IV MaNGA: identification of active galactic nuclei in optical integral field unit surveys
21. Badenes, C., et al., 2018, *The Astrophysical Journal*, 854, 147
Stellar Multiplicity Meets Stellar Evolution and Metallicity: The APOGEE View
20. Albareti, F. D., et al., 2017, *The Astrophysical Journal Supplement Series*, 233, 25
The 13th Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-IV Survey Mapping Nearby Galaxies at Apache Point Observatory
19. Greene, J. E., et al., 2017, *The Astrophysical Journal*, 851, L33
SDSS-IV MaNGA: Probing the Kinematic Morphology-Density Relation of Early-type Galaxies with MaNGA
18. Zasowski, G., et al., 2017, *The Astronomical Journal*, 154, 198
Target Selection for the SDSS-IV APOGEE-2 Survey
17. Zahid, H. J., et al., 2017, *The Astrophysical Journal*, 847, 18
Stellar Absorption Line Analysis of Local Star-forming Galaxies: The Relation between Stellar Mass, Metallicity, Dust Attenuation, and Star Formation Rate
16. Martínez-Rodríguez, H., et al., 2017, *The Astrophysical Journal*, 843, 35
Observational Evidence for High Neutronization in Supernova Remnants: Implications for Type Ia Supernova Progenitors
15. Blanton, M. R., et al., 2017, *The Astronomical Journal*, 154, 28
Sloan Digital Sky Survey IV: Mapping the Milky Way, Nearby Galaxies, and the Distant Universe
14. Linden, S. T., et al., 2017, *The Astrophysical Journal*, 842, 49
Timing the Evolution of the Galactic Disk with NGC 6791: An Open Cluster with Peculiar High-α Chemistry as Seen by APOGEE
13. Zhang, K., et al., 2017, *Monthly Notices of the Royal Astronomical Society*, 466, 3217
SDSS-IV MaNGA: the impact of diffuse ionized gas on emission-line ratios, interpretation of diagnostic diagrams and gas metallicity measurements
12. Jones, A., et al., 2017, *Astronomy and Astrophysics*, 599, A141
SDSS IV MaNGA: Deep observations of extra-planar, diffuse ionized gas around late-type galaxies from stacked IFU spectra

11. Yan, R., et al., 2016, *The Astronomical Journal*, 152, 197
SDSS-IV MaNGA IFS Galaxy Survey—Survey Design, Execution, and Initial Data Quality
10. Law, D. R., et al., 2016, *The Astronomical Journal*, 152, 83
The Data Reduction Pipeline for the SDSS-IV MaNGA IFU Galaxy Survey
9. Holtzman, J. A., et al., 2015, *The Astronomical Journal*, 150, 148
Abundances, Stellar Parameters, and Spectra from the SDSS-III/APOGEE Survey
8. Hayden, M. R., et al., 2015, *The Astrophysical Journal*, 808, 132
Chemical Cartography with APOGEE: Metallicity Distribution Functions and the Chemical Structure of the Milky Way Disk
7. Alam, S., et al., 2015, *The Astrophysical Journal Supplement Series*, 219, 12
The Eleventh and Twelfth Data Releases of the Sloan Digital Sky Survey: Final Data from SDSS-III
6. Nidever, D. L., et al., 2014, *The Astrophysical Journal*, 796, 38
Tracing Chemical Evolution over the Extent of the Milky Way's Disk with APOGEE Red Clump Stars
5. Bovy, J., et al., 2014, *The Astrophysical Journal*, 790, 127
The APOGEE Red-clump Catalog: Precise Distances, Velocities, and High-resolution Elemental Abundances over a Large Area of the Milky Way's Disk
4. Ahn, C. P., et al., 2014, *The Astrophysical Journal Supplement Series*, 211, 17
The Tenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-III Apache Point Observatory Galactic Evolution Experiment
3. Leja, J., et al., 2013, *The Astrophysical Journal*, 778, L24
Exploring the Chemical Link between Local Ellipticals and Their High-redshift Progenitors
2. Zasowski, G., et al., 2013, *The Astronomical Journal*, 146, 81
Target Selection for the Apache Point Observatory Galactic Evolution Experiment (APOGEE)
1. Ahn, C. P., et al., 2012, *The Astrophysical Journal Supplement Series*, 203, 21
The Ninth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-III Baryon Oscillation Spectroscopic Survey

Additional

3. Cherinka, B., et al., 2020, *ASPC*, 527, 743C
Marvin: A Toolkit for Streamlined Access and Visualisation of the SDSS-IV MaNGA Data Set
2. Wilson, J. C., et al., 2012, *SPIE*, 8446, 84460H
Performance of the Apache Point Observatory Galactic Evolution Experiment (APOGEE) high-resolution near-infrared multi-object fiber spectrograph
1. **Andrews, B. H.** & Thompson, T. A., 2011, *EAS Publications Series*, 52, 275
Radiation Pressure Feedback in Galaxies

Brett H. Andrews

Presentations

Invited

Effective Plotting — 2021
DESI Collaboration Meeting

Hidden in Plain Sight: a Deep Learning Approach to Finding Supernovae in Galaxy Maps — 2018
Science 2018, University of Pittsburgh

The SDSS-IV MaNGA Survey: Galaxy Dissection on an Industrial Scale — 2017
CMU Astro Seminar, Carnegie Mellon University

The Mass–Metallicity Relation in SDSS Using Electron Temperature Measurements — 2015
Understanding Nebular Emission in High-Redshift Galaxies, The Carnegie Observatories

Contributed

Jumpstart Your Paper — 2022
AstroPGH Summer Seminar, University of Pittsburgh

AstroCoffee Tips — 2022
AstroPGH Summer Seminar, University of Pittsburgh

Leveraging Statistics and Machine Learning for Probing Galaxy Evolution and Measuring Galaxy Distances — 2022
AstroLunch Seminar, University of Pittsburgh

Effective Plotting — 2021
AstroPGH Summer Seminar, University of Pittsburgh

Effective Plotting — 2020
AstroPGH Summer Seminar, University of Pittsburgh

Effective Plotting — 2018
Astro Student Seminar, University of Pittsburgh

GitHub Flow — 2018
Astro Student Seminar, University of Pittsburgh

MaNGA DAP — 2017
SDSS-IV Collaboration Meeting, Pontificia Universidad Católica de Chile

Streamlining MaNGA Data with Marvin — 2017
AstroLunch, University of Pittsburgh

The State of Marvin — 2016
SDSS-IV Collaboration Meeting, University of Wisconsin

AstroCoffee Presentation Advice — 2016
Astro Student Seminar, University of Pittsburgh

Marvin-tools: Distilling DAP Measurements and & Stacking Spectra — 2016
MaNGA Collaboration Meeting (Cocoa Beach, FL)

Global vs. Resolved Metallicities — 2015
Astro Student Seminar, University of Pittsburgh

Global vs. Resolved Metallicities — 2015
SDSS-IV Collaboration Meeting, Instituto Física Teórica Universidad Autónoma de Madrid

MaNGA Data Analysis Pipeline Quality Assessment — 2015
MaNGA Collaboration Meeting, University of Kentucky

Principal Component Abundance Analysis: APOGEE and flexCE — 2015
Local Group Astrostatistics Conference, University of Michigan

Understanding the Bimodality in [alpha/Fe] with a Chemical Evolution Model — 2014
SDSS-III Collaboration Meeting (Park City, UT)

Applying Principal Component Analysis to APOGEE — 2014
SDSS-IV Collaboration Meeting (Park City, UT)

Exploiting Large Multi-element Stellar Abundance Surveys — 2014
AAS Winter Meeting

Decoding Galactic Chemical Evolution with Gas-phase and Stellar Abundances — 2013
Colloquium, University of Wisconsin

Yields, Delays, and Mixing in Chemical Evolution Models 2013
SDSS-II Collaboration Meeting, Johns Hopkins University

Decoding Galactic Chemical Evolution with Gas-phase and Stellar Abundances 2013
Yale Center for Astronomy & Astrophysics Seminar, Yale University

The Mass–Metallicity Relation: A Window Into Galaxy Evolution 2013
Seminar, National Radio Astronomical Observatory

The Galaxy Mass–Metallicity Relation: A Sensitive Diagnostic of the Processes That Drive Galaxy Evolution 2013
Edward F. Hayes Graduate Research Forum, The Ohio State University

Characterizing the Distribution of Stars in Chemical Abundance Space 2013
APOGEE Collaboration Meeting, The Carnegie Observatories

Accounting for Stellar Abundance Uncertainties in Principal Component Abundance Analysis 2012
APOGEE Collaboration Meeting, Texas Christian University

Principal Component Abundance Analysis: Finding the Principal Components of Chemical Abundance Space 2011
SDSS-III Collaboration Meeting, Vanderbilt University

Radiation Pressure Feedback in Galaxies 2011
Edward F. Hayes Graduate Research Forum, The Ohio State University

Posters

Principal Component Abundance Analysis and Chemical Evolution Models 2014
The Near-Field Deep-Field Connection, University of California, Irvine

Assessing Radiation Pressure as a Feedback Mechanism in Star-forming Galaxies 2011
The 5th Zermatt ISM Symposium