Carnegie Institution of Washington
The Observatories
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James W. Johnson
Curriculum Vitae

jjohnson10@carnegiescience.edu

Academic Positions

Carnegie Institution of Washington – The Observatories — Pasadena, California

2023 – Present **Postdoctoral Fellow**, Carnegie Theoretical Astrophysics Center (CTAC)
Supervisor: Dr. Ana Bonaca

Education

The Ohio State University — Columbus, Ohio

July 2023 **Ph.D. in Astrophysics**, Dissertation Advisor: Prof. David H. Weinberg
From Dwarfs to Spirals: Chemical Evolution of Galaxies across Stellar Mass and the Implications for Nucleosynthesis

Vanderbilt University — Nashville, Tennessee

May 2017 **B.A.**, Physics (major), Astronomy (minor), *cum laude*
Highest Honors in Astronomy, Thesis Advisor: Prof. Andreas A. Berlind

Research

23	8	15	450+	11
Journal Publications	**1st & 2nd Author**	**Contributing Author**	**Citations**	**H-Index**

Interests

Galactic chemical evolution – The Milky Way – Dwarf galaxies – The astrophysical origin of the elements – Big bang nucleosynthesis – Near field cosmology – Astronomical software

NASA ADS Libraries (A full list of my journal publications is included.)

All My Papers https://ui.adsabs.harvard.edu/public-libraries/rIqfpNKmSdaOMIAhkk2VzQ
1st & 2nd Author https://ui.adsabs.harvard.edu/public-libraries/go1WSseGTMeft2SxdESAgw
Co-Author https://ui.adsabs.harvard.edu/public-libraries/sZkjSf_XRSKSRykqBe6B_w

Seminars & Conference Presentations

Poster **Small Galaxies, Cosmic Questions - II** 2024
University of Durham (Durham, United Kingdom)

Contributed Talk **DHWFEST: Dark, Hot, Warm, and Fuzzy mattEr in Space and Time** 2024
University of Utah (Salt Lake City, UT)

Contributed Talk **Sloan Digital Sky Survey Collaboration Meeting** 2024

Invited Seminar **Lund University** (Lund, Sweden) 2024

Contributed Talk **ADONIS: Abundance Gradients in the Local Universe** 2024
Munich Institute for Astro-, Particle, and BioPhysics (MIAPbP) (Munich, Germany)

Contributed Talk	**Surveying the Milky Way: The Universe in Our Own Backyard** California Institute of Technology (Pasadena, CA)	2023
Dissertation Talk	**241st American Astronomical Society Meeting**	2023
Contributed Talk	**Sloan Digital Sky Survey Collaboration Meeting**	2021
Contributed Talk	**Galactic Archaeology with Hermes Science Meeting**	2021
Contributed Talk	**Sloan Digital Sky Survey Collaboration Meeting**	2020
Poster	**236th American Astronomical Society Meeting**	2020
Invited Seminar	**University of California, Santa Cruz** (Santa Cruz, CA)	2019

Astrophysical Software Development

Versatile Integrator for Chemical Evolution (VICE)
Lead developer and license owner (Spring 2018 – Present)
Documentation: https://vice-astro.readthedocs.io
Source Code: https://github.com/giganano/VICE.git
Install: https://pypi.org/project/vice

Observing Programs

2024B **PI**: *The First Extragalactic Measure of the Helium Isotopic Ratio – A New Test of Fundamental Physics*
Clay 6.5-m Telescope, Las Campanas Observatory, WINERED spectrograph, 18 hours

Honors & Awards

2023	**CTAC Postdoctoral Fellowship**, Carnegie Science
2022	**Ann S. Tuttle Paper Prize**, Ohio State, Dept. of Astronomy Annual award to the top graduate student-led publication of the previous year Paper: Johnson J.W., et al., 2021, MNRAS, 508, 4484 (arxiv:2103.09838)
2022 – 2023	**Presidential Fellowship**, Ohio State, College of Arts & Sciences Financial support for final-year graduate students
2017 – 2018	**University Fellowship**, Ohio State, College of Arts & Sciences Financial support for first-year graduate students
2017	**Larry Ross Cathey Award**, Vanderbilt, Dept. of Physics & Astronomy Outstanding graduating senior studying astronomy
Inducted 2015	**Sigma Pi Sigma Physics National Honor Society**, Vanderbilt Chapter
7 of 8 semesters	**Dean's List**, Vanderbilt, College of Arts & Sciences

Mentorship

Cal-Bridge Summer Research Program

2024 – Present **Damien Tessmer** (undergraduate), San Diego State University
Project: Identifying trends in stellar nucleosynthesis with SDSS-V data

The Ohio State University

2022 – Present **Daniel A. Boyea** (undergraduate), Dept. of Astronomy
Project: Investigating the astrophysical origin of carbon
Now: M.Sc. student at University of Victoria (Victoria, BC, Canada)

2021 – Present **Liam O. Dubay** (graduate), Dept. of Astronomy
Projects: Galactic chemical evolution models of the Milky Way disk (arxiv:2404.08509)

2021 – Present **Miqaela K. Weller** (graduate), Dept. of Astronomy
Project: Investigating the astrophysical origin of helium (arxiv:2404.08765)
2022 – 2023 **Lindsey Stultz** (undergraduate), Dept. of Physics
Polaris Near-Peer Mentorship Program

Diversity, Equity & Inclusion

Carnegie Science Observatories

2024 – Present **Research Mentor**, Cal-Bridge Summer Research Program (1 student)
2024 **Advancing Inclusive Mentoring**
12+ hours of instruction and discussion on equitable mentorship practices

Polaris Near-Peer Mentorship Program

Graduate student-leg organization at Ohio State dedicated to fostering a more inclusive environment and improving retention of underrepresented minority groups in the Dept. of Physics and the Dept. of Astronomy. Website: https://u.osu.edu/polaris.

2022 – 2023 **Leadership Committee**, budget: ∼$60,000/year
2022 **Academic Facilitator**, Undergraduate Residential Summer Access Program
Early-arrival program for first-year undergraduate students
2022 – 2023 **Near-Peer Mentor** (1 student)

Teaching

Python Coding Workshops

Program Creator, six sessions, ∼20 hours of instruction and exercises
Website: https://jamesjohnson.space/bootcamp
Source material: https://github.com/giganano/PythonBootcamp
2020 – present **Full program (annually)**: Summer undergraduate research students
The Ohio State University, Dept. of Astronomy
2022 **Full program**: 1st- & 2nd-year graduate students
The Ohio State University, Dept. of Astronomy
2024 **Select sessions**: CASSI & Cal-Bridge undergraduate research students
Carnegie Science Observatories

The Ohio State University, Department of Astronomy: Graduate Teaching Assistant

2018 – 2020	**Astronomy 1101: From Planets to Cosmos**	5 sections
2019	**Astronomy 1142: Black Holes**	1 section
2019	**Astronomy 1221: Astronomy Data Analysis**	1 section
2018	**Astronomy 1140: Planets and the Solar System**	1 section

Miscellaneous

2022 – Present **Manuscript Referee**: ApJ, MNRAS, PASJ
2024 – Present **Working Group Co-Chair**, Galactic Genesis, Sloan Digital Sky Survey V
2024 – Present **"Morning Tea" co-organizer** (daily arXiv discussion), Carnegie Science
2024 **External Panelist**, Hubble Space Telescope Cycle 32 Proposal Review
2021 – 2023 **"Galaxy Hour" meeting organizer**, Ohio State, Dept. of Astronomy
2017 – 2023 **Diversity Journal Club**, Ohio State, Dept. of Astronomy

June 2020 **Real Scientists Germany Online Outreach**
Blog: https://tinyurl.com/jamesjohnsonrealscientistsDE
Twitter: https://twitter.com/realsci_DE

2015 – 2017 **Undergraduate Tutor, Proctor, Grader**
Vanderbilt University, Dept. of Physics & Astronomy

2015 **Cosmic Ray Observatory Project**, Instrumentation lab
University of Nebraska-Lincoln, Dept. of Physics

Journal Publications

First & Second Author (reverse chronological order)

1. *Rising from the Ashes II: The Bar-driven Abundance Bimodality in the Milky Way*
Beane A., **Johnson J.W.**, Semenov V., Hernquist L., Chandra V., Conroy C.
2024, submitted to AAS Journals, under peer review arxiv:2410.21580

2. *The Milky Way Radial Metallicity Gradient as an Equilibrium Phenomenon: Why Old Stars are Metal-Rich*
Johnson J.W., et al.
2024, submitted to AAS Journals, under peer review arxiv:2410.13256

3. *Dwarf galaxy archaeology from chemical abundances and star formation histories*
Johnson J.W., et al.
2023, MNRAS, 526, 5084 – 5109 arxiv:2210.01816

4. *Binaries drive high Type Ia supernova rates in dwarf galaxies*
Johnson J.W., Kochanek C.S., Stanek K.Z.
2023, MNRAS, 526, 5911 – 5918 arxiv:2210.01818

5. *Empirical constraints on the nucleosynthesis of nitrogen*
Johnson J.W., Weinberg D.H., Vincenzo F., Bird J.C., Griffith E.J.
2023, MNRAS, 520, 782 – 803 arxiv:2202.04666

6. *Stellar migration and chemical enrichment in the Milky Way disc: a hybrid model*
Johnson J.W., et al.
2021, MNRAS, 508, 4484 – 4511 arxiv:2103.09838

7. *The impact of starbursts on element abundance ratios*
Johnson J.W., Weinberg D.H.
2020, MNRAS, 498, 1364 – 1381 arxiv:1911.02598

8. *The secondary spin bias of dark matter haloes*
Johnson J.W., Maller A.H., Berlind A.A., Sinha M., Holley-Bockelmann J.K.
2019, MNRAS, 486, 1156 – 1166 arxiv:1812.02206

Contributing Author (reverse chronological order)

1. *Many Elements Matter: Detailed Abundance Patterns Reveal Star-formation and Enrichment Differences among Milky Way Structural Components*
Griffith E.J., Hogg D.W., Hasselquist S., **Johnson J.W.**, Price-Whelan A., Sit T., Stone-Martinez A., Weinberg D.H.
2024, submitted to AAS Journals, under peer review arxiv:2410.22121

2. *Modeling the Galactic Chemical Evolution of Helium*
   Weller M.K., Weinberg D.H., **Johnson J.W.**
   2024, submitted to MNRAS, under peer review arxiv:2404.08765

3. *Galactic Chemical Evolution Models Favor an Extended Type Ia Supernova Delay-Time Distribution*
   Dubay L.O., Johnson J.A., **Johnson J.W.**
   2024, ApJ, 973, 55 – 80 arxiv:2404.08059

4. *The APO-K2 Catalog. II. Accurate Stellar Ages for Red Giant Branch Stars Across the Milky Way*
   Warfield J.T., et al., incl. **Johnson J.W.**
   2024, AJ, 167, 208 – 231 arxiv:2403.03249

5. *Nature vs. Nurture: Distinguishing effects from stellar processing and chemical evolution on carbon and nitrogen in red giant stars*
   Roberts J.D., et al., incl. **Johnson J.W.**
   2024, MNRAS, 530, 149 – 166 arxiv:2403.03249

6. *The Scale of Stellar Yields: Implications of the Measured Mean Iron Yield of Core Collapse Supernovae*
   Weinberg D.H., Griffith E.J., **Johnson J.W.**, Thompson T.A.
   2023, ApJ, 973, 122 – 136 arxiv:2309.05719

7. *Untangling the Sources of Abundance Dispersion in Low-Metallicity Stars*
   Griffith E.J., Johnson J.A., Weinberg D.H., Ilyin I., **Johnson J.W.**, Rodriguez-Martinez R., Strassmeier K.G.
   2022, ApJ, 944, 47 – 67 arxiv:2210.01821

8. *Birth of the Galactic Disk Revealed by the H3 Survey*
   Conroy C., et al., incl. **Johnson J.W.**
   2022, submitted to AAS Journals, under peer review arxiv:2204.02989

9. *Primordial Helium-3 Redux: The Helium Isotope Ratio of the Orion Nebula*
   Cooke R.J., Noterdaeme P., **Johnson J.W.**, Pettini M., Welsh L., Peroux C., Murphy M.T., Weinberg D.H.
   2022, ApJ, 932, 60 – 76 arxiv:2203.11256

10. *Residual Abundances in GALAH DR3: Implications for Nucleosynthesis and Identification of Unique Stellar Populations*
    Griffith E.J., Weinberg D.H., Buder S., Johnson J.A., **Johnson J.W.**, Vincenzo F.
    2021, ApJ, 931, 23 – 50 arxiv: 2110.06240

11. *Chemical Cartography with APOGEE: Mapping Disk Populations with a Two-Process Model and Residual Abundances*
    Weinberg D.H., et al., incl. **Johnson J.W.**
    2021, ApJS, 260, 32 – 77 arxiv:2108.08860

12. *CNO dredge-up in a sample of APOGEE/Kepler red giants: Tests of stellar models and galactic evolutionary trends of N/O and C/N*
    Vincenzo F., et al., incl. **Johnson J.W.**
    2021, submitted to MNRAS, under peer review arxiv:2106.03912

13. *The Impact of Black Hole Formation on Population-averaged Supernova Yields*
Griffith E.J., Sukhbold T., Weinberg D.H., Johnson J.A., **Johnson J.W.**, Vincenzo F.
2021, ApJ, 921, 73 – 94 arxiv:2103.09837

14. *Nucleosynthesis signatures of neutrino-driven winds from proto-neutron stars: a perspective from chemical evolution models*
Vincenzo F., Thompson T.A., Weinberg D.H., Griffith E.J., **Johnson J.W.**, Johnson J.A.
2021, MNRAS, 508, 3499 – 3507 arxiv:2102.04920

15. *The Similarity of Abundance Ratio Trends and Nucleosynthetic Patterns in the Milky Way Disk and Bulge*
Griffith E.J., et al., incl. **Johnson J.W.**
2021, ApJ, 909, 77 – 101 arxiv:2009.05063