

Carnegie Institution of Washington  
The Observatories  
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James W. Johnson  
Curriculum Vitae  
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## 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>  
First Author <https://ui.adsabs.harvard.edu/public-libraries/go1WSseGTMeft2SxdESAgw>  
Co-Author [https://ui.adsabs.harvard.edu/public-libraries/sZkjSf\\_XRSKSRykqBe6B-w](https://ui.adsabs.harvard.edu/public-libraries/sZkjSf_XRSKSRykqBe6B-w)

### Seminars & Conference Presentations

Poster	<b>Small Galaxies, Cosmic Questions - II</b>	2024
	University of Durham (Durham, United Kingdom)	
Contributed Talk	<b>DHWFEST: Dark, Hot, Warm, and Fuzzy matter in Space and Time</b>	2024
	University of Utah (Salt Lake City, UT)	
Contributed Talk	<b>Sloan Digital Sky Survey Collaboration Meeting</b>	2024
Invited Seminar	<b>Lund University</b> (Lund, Sweden)	2024
Contributed Talk	<b>ADONIS: Abundance Gradients in the Local Universe</b>	2024
	Munich Institute for Astro-, Particle, and BioPhysics (MIAPbP) (Munich, Germany)	

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

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- 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

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### 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

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### 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

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### 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**: 1<sup>st</sup>- & 2<sup>nd</sup>-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

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|-------------|---|------------|
| 2018 – 2020 | <b>Astronomy 1101: From Planets to Cosmos</b>       | 5 sections |
| 2019        | <b>Astronomy 1142: Black Holes</b>                  | 1 section  |
| 2019        | <b>Astronomy 1221: Astronomy Data Analysis</b>      | 1 section  |
| 2018        | <b>Astronomy 1140: Planets and the Solar System</b> | 1 section  |

## MISCELLANEOUS

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- 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](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

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**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