JOEL C. ZINN

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Assistant Professor
Department of Physics and Astronomy, California State University, Long Beach
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Citizenship: USA

EDUCATION

Ohio State University
Ph.D. in Astronomy   *August 2014 – May 2019*
Dissertation: *Accurate red giant distances and radii with asteroseismology*
Advisor: Marc H. Pinsonneault
M.S. in Astronomy   *December 2016*

Princeton University
B.A. in Astrophysical Sciences, magna cum laude   *June 2013*
Thesis: *A study in weak lensing magnification with* WISE *AGN and SDSS galaxies*
Minor in Theatre

APPOINTMENTS

California State University, Long Beach
Assistant Professor, Department of Physics and Astronomy   *January 2023 - Present*

American Museum of Natural History
NSF Astronomy & Astrophysics Postdoctoral Fellow   *October 2020 - January 2023*

University of New South Wales
Associate Researcher, School of Physics   *June 2019 - September 2020*
Advisor: Dennis Stello

RESEARCH INTERESTS

Asteroseismology and Galactic archaelogy; large-scale astronomical surveys; red giant stellar evolution and structure; Gaia astrometry; Milky Way age-velocity relations; statistical data analysis and machine learning methods

REFEREED PUBLICATIONS

40 total; 8 first-author; h-index: 21 (8 August 2023 via **ADS**)

First- and second-author

12. **Zinn, J. C.**; et al. *The K2 Galactic Archaeology Program Data Release 3: age-abundance patterns in C1-C8, C10-C18*, ApJ, Volume 926, Issue 2, 2022 (arXiv:2108.05455)

11. **Zinn, J. C.** *Validation of the Gaia Early Data Release 3 parallax zero-point model with asteroseismology*, AJ, Volume 161, Issue 5, 2021 (arXiv:2101.07252)

10. Grunblatt, S. K.; **Zinn, J. C.**; et al. *Age-dating red giant stars associated with Galactic disk and halo substructures*, ApJ, Volume 916, Issue 2, 2021 (arXiv:2105.10505)

9. Warfield, J. T.; **Zinn, J. C.**; et al. *An intermediate-age alpha-rich Galactic population in K2*, AJ, Volume 161, Issue 3, 2021 (arXiv:2102.03377)

8. **Zinn, J. C.**; et al. *The K2 Galactic Archaeology Program Data Release 2: asteroseismic results from Campaigns 4, 6, & 7*, ApJS, Volume 251, Issue 2, 2020 (arXiv:2012.04051)

7. **Zinn, J. C.**; Pinsonneault, M. H.; Huber, D.; Stello, D.; Stassun, K; Serenelli, A., *Testing the radius scaling relation with* Gaia *DR2 in the* Kepler *field*, ApJ, Volume 885, Issue 2, 2019 (arXiv:1910.00719)

6. **Zinn, J. C.**; Stello, D.; Huber, D.; Sharma, S., *The Bayesian Asteroseismology data Modeling Pipeline and its application to K2 data*, ApJ, Volume 884, Issue 2, 2019 (arXiv:1909.11927)

5. **Zinn, J. C.**; Pinsonneault, M. H.; Huber, D.; Stello, D. *Confirmation of the* Gaia *DR2 parallax zero-point offset using asteroseismology and spectroscopy in the* Kepler *field*, ApJ, Volume 878, Issue 2, 2019 (arXiv:1805.02650)

4. **Zinn, J. C.**; Huber, D.; Pinsonneault, M. H.; Stello, D., *Evidence for spatially-correlated* Gaia *parallax errors in the* Kepler *field*, ApJ, Volume 844, Issue 2, 2017 (arXiv:1706.09416)

3. Huber, D.; **Zinn, J. C.**; et al. (+ 18 additional authors), *Asteroseismology and* Gaia*: testing scaling relations using 2200* Kepler *stars with TGAS parallaxes*, ApJ, Volume 844, Issue 2, 2017 (arXiv:1705.04697)

2. Stello, D.; **Zinn, J. C.**; et al. (+ 12 additional authors), *The* K2 *Galactic Archaeology Program Data Release 1: asteroseismic results from Campaign 1*, ApJ, Volume 835, Issue 1, 2017 (arXiv:1611.09852)

1. **Zinn, J. C.**; Kochanek, C. S.; et al. (+ 12 additional authors), *Variable classification in the LSST era: exploring a model for quasi-periodic light curves*, MNRAS, Volume 468, Issue 2, 2017 (arXiv:1612.04834)

Contributed publications

Contributed to analysis/interpretation

23. Angus, R.; Price-Whelan, A. M.; **Zinn, J. C.**; Foreman-Mackey, D.; Bedell, M.; Lu, Y. *The 3D Galactocentric velocities of Kepler stars: marginalizing over missing RVs*, Accepted to AJ

22. Sharma, S.; Stello, D.; **Zinn, J. C.**; Bland-Hawthorn, J. *The K2 Galactic Archaeology Program: Overview, target selection and survey properties*, Submitted to MNRAS (arXiv:2109.12173)

21. Hon, M.; Huber, D.; Kuszlewicz, J. S.; Stello, D.; Sharma, S.; Tayar, J.; **Zinn, J. C.**; Vrard, M.; Pinsonneault, M. H. *A 'Quick Look' at all-sky Galactic archeology with TESS: 158,000 oscillating red giants from the MIT Quick-Look Pipeline*, ApJ, Volume 919, Issue 2, 2021 (arXiv:2108.01241)

20. Kolecki, J. R.; Wang, J.; Johnson, J. A.; **Zinn, J. C.**; Ilyin, I.; Strassmeier, K. G. *Searching for transiting planets around halo stars. I. Sample selection and validation*, AJ, Volume 162, Issue 4, 2021 (arXiv:2106.13251)

19. Boley, K. M.; Wang, J.; **Zinn, J. C.**; Collins, K. A.; Collins, K. I.; Gan, T.; Li, T. S. *Searching for transiting planets around halo stars. II. constraining the occurrence rate of Hot Jupiters*, AJ, Volume 162, Issue 3, 2021 (arXiv:2106.13242)

18. Sharma, S.; Hayden, M. R.; Bland-Hawthorn, J.; Stello, D.; Buder, S.; **Zinn, J. C.**; et al. (+32 additional authors), *Fundamental relations for the velocity dispersion of stars in the Milky Way*, MNRAS, Volume 506, Issue 2, 2021 (arXiv:2004.06556)

17. Riess, A. G.; Casertano, S.; Yuan, W.; Bowers, B. J.; Macri, L.; **Zinn, J. C.**, Scolnic, D. *Cosmic distances calibrated to 1% precision with Gaia EDR3 parallaxes and Hubble Space Telescope photometry of 75 Milky Way Cepheids confirm tension with ΛCDM*, ApJL, Volume 908, Issue 1, 2021 (arXiv:2012.08534)

16. Aguado, D. S.; (+ 230 additional authors); **Zinn, J. C.**; and Zou, H., *The fifteenth data release of the Sloan Digital Sky Surveys: first release of MaNGA-derived quantities, data visualization tools, and stellar library*, ApJS, Volume 240, Issue 2, 2019 (arXiv:1812.02759)

15. Pinsonneault, M. H.; Elsworth, Y. P.; Tayar, J.; Serenelli, A.; Stello, D.; **Zinn, J. C.**; et al. (+ 30 additional authors), *The second APOKASC catalog: the empirical approach*, ApJS, Volume 239, Issue 32, 2018 (arXiv:1804.09983)

14. Abolfathi, B.; (+ 345 additional authors); **Zinn, J. C.**; and Zou, H., *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*, ApJS, Volume 235, Issue 2, 2018 (arXiv:1707.09322)

13. Albareti, F. D.; (+ 341 additional authors); **Zinn, J. C.**; and Zou, H., *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*, ApJS, Volume 233, Issue 2, 2017 (arXiv:1608.02013)

12. (+ 493 additional authors); **Zinn, J. C.**, *The ninth data release of the Sloan Digital Sky Survey: first spectroscopic data from the SDSS-III Baryon Oscilla-

tion Spectroscopic Survey, ApJS, Volume 203, Issue 2, 2012 (arXiv:1207.7137)

Contributed asteroseismic data from my BAM pipeline or from K2 GAP

11. Reyes, C.; Stello; D.; Hon, M.; **Zinn, J. C.** *Vetting asteroseismic $\Delta\nu$ measurements using neural networks*, MNRAS, Volume 511, Issue 4, 2022 (arXiv:2202.05478)

10. Sharma, S.; et al. (incl. **Zinn, J. C.**), *The GALAH Survey: Dependence of elemental abundances on age and metallicity for stars in the Galactic disc*, MNRAS, Volume 510, Issue 1, 2022 (arXiv:2011.13818)

9. Chanamé, J.; Pinsonneault, M. H., Aguilera-Gómez, C.; **Zinn, J. C.** *Mass matters: no evidence for ubiquitous lithium production in low-mass clump giants*, Submitted to ApJ (arXiv:2109.13955)

8. Silva Aguirre, V.; et al. (incl. **Zinn, J. C.**), *Detection and characterization of oscillating red giants: first results from the TESS satellite*, ApJL, Volume 889, Issue 2, 2020 (arXiv:1912.07604)

7. Sharma, S.; Stello, D.; Bland-Hawthorn, J.; Hayden, M. R.; **Zinn, J. C.**; (+ 32 additional authors), *The* K2-*HERMES survey: age and metallicity of the thick disk*, MNRAS, Volume 490, Issue 4, 2019 (arXiv:1904.12444)

6. Grunblatt, S. K.; Huber, D.; Gaidos, E.; Hon, M., **Zinn, J. C.**, Stello, D., *Giant planet occurrence within 0.2 au of low-luminosity red giant branch stars with* K2, AJ, Volume 158, Issue 6, 2019 (arXiv:1910.05346)

5. Buder, S.; (+ 40 additional authors); **Zinn, J. C.**; and Žerjal, M., *The GALAH survey: second data release*, MNRAS, Volume 478, Issue 4, 2018 (arXiv:1804.06041)

4. Hon, M.; Stello, D.; and **Zinn, J. C.**, *Detecting solar-like oscillations in red giants with deep learning*, ApJ, Volume 859, Issue 1, 2018 (arXiv:1804.07495)

3. Slepian, Z.; Gott, R.; and **Zinn, J. C.**, *A one-parameter formula for testing slow-roll dark energy: observational prospects*, MNRAS, Volume 438, Issue 3, 2014 (arXiv:1301.4611)

Contributed observational data

2. Kennedy, M. R.; Callanan, P.; Garnavich, P. M.; Fausnaugh, M.; **Zinn, J. C.**, XMM-Newton *observations of the peculiar cataclysmic variable Lanning 386: X-ray evidence for a magnetic primary*, MNRAS, Volume 466, Issue 2, 2017 (arXiv:1612.04397)

1. More, A.; Oguri, M.; Kayo, I.; **Zinn, J. C.**; et al. (+ 14 additional authors), *The SDSS-III BOSS quasar lens survey: discovery of 13 gravitationally lensed quasars*, MNRAS, Volume 456, Issue 2, 2016 (arXiv:1509.07917)

EXTERNAL FUNDING

NASA New York Space Grant, $15,000   *2022*
"Pre-main sequence asteroseismology", Senior personnel for CCNY undergraduate
Sarah Medina

NASA Astrophysics Theory Program, $400,000   *2022–2025*
"Modeling Red Giants: A Fundamental Diagnostic for Ages Across the Universe",
Collaborator

NASA Astrophysics Theory Program, *Not funded*   *2022–2025*
"Asteroseismology and Stellar Physics for Evolved Red Giants", Co-I

NSF Astronomy & Astrophysics Postdoctoral Fellowship, $300,000   *2020–2023*
"Galactic Archaeology Using Luminous Red Giant Asteroseismology with TESS and
Gaia", PI

Kavli Institute for Theoretical Physics Graduate Fellowship, $13,000   *2019*

AWARDS AND HONORS

AAS Doxsey Travel Prize   *2019*

Ann S. Tuttle Citizenship, Engagement, and Outreach Prize   *2018*

Elected to the Society of Sigma Xi   2013

PROFESSIONAL SERVICE

American Museum of Natural History seminar committee member   *2021*

2022 NSF Astronomy & Astrophysics Fellowship Symposium organizer   *2021*

Lead organizer of the Gaia EDR3 Early Science and Best Practices workshop *2021*

AAS Astronomy Ambassador   *2019 – Present*

APO-K2 Asteroseismology and Chemical Abundance Collaboration   *2016 – Present*
Collaborator/External Collaborator

APOKASC Asteroseismology and Chemical Abundance Collaboration *2016 – Present*
Collaborator/External Collaborator

American Astronomical Society member   *2016 – Present*

Scientific referee for: *Astrophysical Journal, Monthly Notices of the Royal Astronomical Society*, and *Astronomy & Astrophysics*

SELECTED CONTRIBUTED AND INVITED (*) TALKS

*California State University, Long Beach, Long Beach, CA   *February 2022*

GothamFest, New York, NY   *December 2021*

*Centre College, Danville, KY   *November 2021*

NSF Astronomy & Astrophysics Postdoctoral Fellows Symposium	*February 2021*
*AMNH Astro Seminar	*September 2020*
AAS 235	*January 2020*
*Institute for Astronomy, University of Hawai'i Seminar	*October 2019*
*Centre College, Danville, KY	*April 2019*
*Kavli Institute for Theoretical Physics	*February 2019*
AAS 233	*January 2019*
SDSS-IV Collaboration Meeting	*June 2018*
Galactic Archaeology, *Kepler* & *K2* Science Conference IV	*June 2017*
*Galactic Archaeology with Kepler and K2, AAS 229	*January 2017*

TEACHING AND MENTORING

AMNH Lang Science Program developer and instructor   *2019 – Present*
Developing high school after school program astronomy courses integrating theatre, music, dance, & visual art and implementing them as part of the American Museum of History's Lang Science Program.

Life in the universe (Non-major), Head lab instructor, OSU   *Fall 2014, Spring 2015*

Jessica Schonhut-Stasik, Vanderbilt U. Astronomy grad student   *2021 – Present*
Advising her work on understanding binary and low-metallicity populations in K2 GAP.

Amanda Ash, OSU Astronomy grad student   *2021 – Present*
Co-supervising with Marc Pinsonneault her project on improving asteroseismic models of evolved giant stars.

Sarah Medina, City College of New York Physics undergrad   *2021 – Present*
Advised her research project on characterizing solar-like oscillations in pre–main sequence stars in her position as an AstroCom NYC scholar. She was selected to participate in Caltech's 2021 FUTURE of physics program, and is applying to graduate school programs. She received a $15,000 NASA Space Grant to continue her research in Spring 2022.

Krisann Stephany, OSU Astronomy undergrad & SURP researcher   *2018 – 2019*
Supervised her development of a planetarium show, "Origin of the elements", and aligning its content to national education standards. Collaborated with local teachers for her to create and implement a middle school module based on the show.

Jack Warfield, OSU Astronomy undergrad   *2018 – Present*
Co-supervised with Marc Pinsonneault and Jennifer Johnson his generation of a *K2* asteroseismology–APOGEE catalogue, and subsequent publication reporting an asteroseismically-young, chemically-old stellar population (arXiv:2102.03377). He is currently working on Galactic archaeology applications of K2 GAP ages with APOGEE spectroscopic data.

PUBLIC OUTREACH

Facilitator (telescope nights & hands-on activities in Sydney)   *2019 – 2020*

Show presenter and designer, Arne Slettebak OSU Planetarium   *2014 – 2019*

Organizer, Astronomy on Tap (informal lectures at local bars)   *2015 – 2016*

OBSERVING EXPERIENCE

LBT Observatory, Large Binocular Telescope   *June 2016*
Instrument: Multi-Object Double CCD Spectrograph/Imager; Large Binocular Camera; LUCI (infrared spectrograph/imager)
Description: Ohio State queue observing — **88 hours**

MDM Observatory, 2.4m Hiltner Telescope   *September 2015*
Instrument: Ohio State Multi-Object Spectrograph (Blue)
Description: Ohio State queue observing — **88 hours**

MDM Observatory, 2.4m Hiltner Telescope   *June 2015*
Instrument: Ohio State Multi-Object Spectrograph (Red)
Description: Deep imaging and spectroscopy of lens candidates, **Principal Investigator — 24 hours**