

Megan Bedell

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Positions Held

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|----------------|--|
| 2019 – present | Associate Research Scientist , Center for Computational Astrophysics, Flatiron Institute
<i>Junior faculty equivalent at a non-profit research institute</i> |
| 2021 – present | Research Associate , American Museum of Natural History
<i>Zero-time affiliation with NYC-area academic institution</i> |
| 2017 – 2019 | Flatiron Research Fellow , Center for Computational Astrophysics, Flatiron Institute
<i>Independent postdoctoral research fellowship</i> |

Education

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|-------------|---|
| 2012 – 2017 | University of Chicago
Ph.D. in Astronomy & Astrophysics
<i>Dissertation Title: Illuminating the Origins of Planets with Solar Twins</i>
<i>Advisor: Jacob L. Bean</i> |
| 2008 – 2012 | Haverford College
B.S. with Honors in Physics and with Highest Honors in Astronomy |

Current Research Themes

- **Statistical methods for extreme precision radial velocity (EPRV) planet-finding:** I developed the influential wobble method for data-driven RV measurement, which is now being used by multiple EPRV groups worldwide through [my open-source software implementation](#). I also work on EPRV challenges including instrument calibration and stellar variability using similarly novel statistical techniques.
- **Precise spectroscopic characterization of exoplanet search target stars:** I am an expert in cutting-edge high-precision characterization of Sun-like stars. Most recently, I co-lead (with Annelies Mortier) the [gr8stars](#) collaboration, a large international effort to robustly & uniformly determine parameters and abundances of >2,000 bright, nearby, Sun-like stars that are crucial to near-future exoplanet searches.
- **Next-generation exoplanet surveys:** I am a consortium member, Science Working Group member, and Data Reduction sub-group lead for the *Terra Hunting Experiment*, an upcoming EPRV mission. I am also a member of the Science Team for the *Keck Planet Finder*.

Mentorship & Teaching

- **Graduate students** supervised through the CCA Visiting Pre-Doctoral Scholar program (est. 2019):
 - Arjun Savel (UMD College Park) — 2022–present
 - Chris Lam (University of Florida) — 2022–present
 - Quang Tran (UT Austin) — 2021–2022
 - Arvind Gupta (Penn State) — 2021–2022
 - Lily L. Zhao (Yale University) — 2019–2021, resulting in 1 publication
- **Undergraduates** supervised through summer programs including the Simons–NSBP Scholars Program, CUNY AstroCOM, and the Barnard Summer Research Institute:
 - Nusrat Jahan (CUNY Hunter College) — 2022
 - Lianys Feliciano (CUNY Hunter College) — 2022
 - Joann Roberts (Chicago State University) — 2020, resulting in senior thesis
 - Ilana Doran (Barnard College) — 2019–2021
 - Angus Beane (University of Pennsylvania) — 2018, resulting in 1 publication

- Instructor for the *LSST Data Science Fellowship Program* Session 10, 2019
- External examiner on thesis committees at Columbia University and Yale University
- Guest lecturer for graduate classes at Columbia University, CUNY Graduate Center, and Universidade de São Paulo
- Laboratory instructor for University of Chicago astronomy courses, 2012–2013

Leadership & Service

- Organizer, CCA Colloquium, 2021–present
- Member, Flatiron Institute Committee for Diversity, Equity, and Inclusion, 2020–present
- Member, CCA Pre-Doctoral Scholar Hiring Committee, 2022–present
- Member, Hiring Process Committee, 2020–present [*group responsible for defining and overseeing the annual postdoc hiring process at CCA*]
- Member, Director Search Committee, 2020 [*small committee responsible for overseeing hiring of new CCA director*]
- Organizer, Astronomical Data Group weekly meeting, 2019–present
- Science Organizing Committee member or co-chair for 6 conferences/workshops to date, including: *EPRV V* (2023, Santa Barbara); *TESS Science Conference II* (2021, virtual); *Telluric Line Hack Week* (2019, NYC); *Building Early Science with TESS* (2019, Chicago); *TESS Preparatory Workshop* (2018, NYC); *Precision Spectroscopy* (2017, São Paulo)
- Time Allocation Committee member for 2 NASA cycles to date
- Grant reviewer for NASA, NSF, Swiss National Science Foundation
- Active referee for AAS, MNRAS, A&A journals

Contributions to Open Science

- Creator of the [gaia-kepler.fun](#) crossmatch database, used in [50 peer-reviewed publications to date](#)
- Co-creator (with Annelies Mortier) of the [gr8stars](#) database, a public-access repository of high-resolution spectra for a *Gaia*-selected sample of bright Northern-hemisphere FGK stars
- Developer of the [wobble](#) open-source code in python + TensorFlow
- Contributor to widely used astronomical open-source software including [eleanor](#), [radvel](#)

Outreach & Press

- Interviewed for [NPR All Things Considered](#), [Nature](#), [PBS News Hour](#), [Scientific American](#).
- Featured profile for the [Flatiron Scientist Spotlight](#).
- 3 first-author papers covered by press including [Science News article](#), [ESO press release](#) [picked up by Associated Press]
- Creator of TESS Roulette interactive data viewer (<https://tess.casino>); 43000 pageviews
- Local organizer for NYC Dept of Education STEM Career Day, 2018
- Astronomy on Tap presenter in NYC & Chicago, co-founder of Chicago AoT branch, 2016–2018
- Presenter, Chicago Life Long Learning, 2015–2017
- Presenter, Adler Planetarium Space Visualization Lab, 2014–2017

Honors

- Outstanding Paper Award, International Astrostatistics Association (2020)
- Josephine DeKarman Fellow (2016–2017)
- Lewis & Clark Field Scholar in Astrobiology (2016–2017)
- Illinois Space Grant Fellow (2016–2017)
- University of Chicago Harper Dissertation Fellow (2016–2017)
- NSF Graduate Research Fellow (2013–2016)
- Phi Beta Kappa (2012)

Selected Invited Talks

- University of Pennsylvania Astro Seminar, April 2021
- Flatiron Institute Seminar, April 2021
- University of Cambridge Exo-Cam Seminar, February 2020
- University College London Seminar, February 2020
- Penn State CEHW Seminar, December 2019
- Flatiron-Wide Algorithms and Mathematics Workshop, October 2019 [\[slides online\]](#)
- Princeton IAS Seminar, September 2019
- Sagan Summer Workshop, July 2019 [\[watch online\]](#)
- American Museum of Natural History Colloquium, May 2019
- Gordon Research Conference on Origins of Solar Systems, May 2019
- Carnegie DTM Colloquium, March 2019 [\[watch online\]](#)
- Cool Stars 20 (contributed plenary talk), August 2018 [\[slides online\]](#)
- Princeton Computational Astrophysics Workshop Series, May 2018 [\[materials online\]](#)
- Vanderbilt Astro Seminar, April 2018

Total Papers: 49 (42 refereed); **First-Author Papers:** 6; **Total Citations:** 1599; **h-index:** 24

- Moran, A., Mingarelli, C., **Bedell, M.**, & Good, D., 2022, [Further Improving Distances to Binary Millisecond Pulsars With Gaia EDR3](#), arXiv e-prints
- Behmard, A., Ness, M., Cunningham, E., & **Bedell, M.**, 2022, [Elemental Abundances of Kepler Objects of Interest in APOGEE DR17](#), arXiv e-prints
- Angus, R., Price-Whelan, A., Zinn, J., **Bedell, M.**, *et al.*, 2022, [The 3D Galactocentric Velocities of Kepler Stars: Marginalizing Over Missing Radial Velocities](#), *AJ*, **164**, 25
- Zhao, L., Fischer, D., Ford, E., Wise, A., *et al.*, 2022, [The EXPRES Stellar Signals Project II. State of the Field in Disentangling Photospheric Velocities](#), *AJ*, **163**, 171
- Gan, T., Lin, Z., Wang, S., Mao, S., *et al.*, 2022, [TOI-530b: A Giant Planet Transiting an M-Dwarf Detected by TESS](#), *MNRAS*, **511**, 83
- Luger, R., **Bedell, M.**, Foreman-Mackey, D., Crossfield, I., *et al.*, 2021, [Mapping Stellar Surfaces III: An Efficient, Scalable, and Open-Source Doppler Imaging Model](#), arXiv e-prints
- Gan, T., **Bedell, M.**, Wang, S., Foreman-Mackey, D., *et al.*, 2021, [HD 183579b: A Warm Sub-Neptune Transiting a Solar Twin Detected by TESS](#), *MNRAS*, **507**, 2220
- Hedges, C., Hughes, A., Zhou, G., David, T., *et al.*, 2021, [TOI-2076 and TOI-1807: Two Young, Comoving Planetary Systems Within 50 Pc Identified by TESS That Are Ideal Candidates for Further Follow Up](#), *AJ*, **162**, 54
- Spina, L., Sharma, P., Meléndez, J., **Bedell, M.**, *et al.*, 2021, [Chemical Evidence for Planetary Ingestion in a Quarter of Sun-Like Stars](#), *Nature Astronomy*, **5**, 1163
- David, T., Contardo, G., Sandoval, A., Angus, R., *et al.*, 2021, [Evolution of the Exoplanet Size Distribution: Forming Large Super-Earths Over Billions of Years](#), *AJ*, **161**, 265
- Anderson, S., Dittmann, J., Ballard, S., & **Bedell, M.**, 2021, [Higher Compact Multiple Occurrence Around Metal-Poor M-Dwarfs and Late-K-Dwarfs](#), *AJ*, **161**, 203
- **Zhao, L.***, Hogg, D., **Bedell, M.**, & Fischer, D., 2021, [Excalibur: A Nonparametric, Hierarchical Wavelength Calibration Method for a Precision Spectrograph](#), *AJ*, **161**, 80
- Spina, L., Nordlander, T., Casey, A., **Bedell, M.**, *et al.*, 2020, [How Magnetic Activity Alters What We Learn From Stellar Spectra](#), *ApJ*, **895**, 52
- Montet, B., Feinstein, A., Luger, R., **Bedell, M.**, *et al.*, 2020, [The Young Planet DS Tuc Ab Has a Low Obliquity](#), *AJ*, **159**, 112
- Vedantham, H., Callingham, J., Shimwell, T., Tasse, C., *et al.*, 2020, [Coherent Radio Emission From a Quiescent Red Dwarf Indicative of Star-Planet Interaction](#), *Nature Astronomy*, **4**, 577
- Pope, B., **Bedell, M.**, Callingham, J., Vedantham, H., *et al.*, 2020, [No Massive Companion to the Coherent Radio-Emitting M Dwarf GJ 1151](#), *ApJ*, **890**
- Angus, R., Morton, T., Foreman-Mackey, D., van Saders, J., *et al.*, 2019, [Toward Precise Stellar Ages: Combining Isochrone Fitting With Empirical Gyrochronology](#), *AJ*, **158**, 173
- **Bedell, M.**, Hogg, D., Foreman-Mackey, D., Montet, B., & Luger, R., 2019, [WOBBLE: A Data-Driven Analysis Technique for Time-Series Stellar Spectra](#), *AJ*, **158**, 164
- Feinstein, A., Montet, B., Foreman-Mackey, D., **Bedell, M.**, *et al.*, 2019, [Eleanor: An Open-Source Tool for Extracting Light Curves From the TESS Full-Frame Images](#), *PASP*, **131**, 94502
- Blancato, K., Ness, M., Johnston, K., Rybizki, J., & **Bedell, M.**, 2019, [Variations in \$\alpha\$ -element Ratios Trace the Chemical Evolution of the Disk](#), *ApJ*, **883**, 34
- Kreidberg, L., Luger, R., & **Bedell, M.**, 2019, [No Evidence for Lunar Transit in New Analysis of Hubble Space Telescope Observations of the Kepler-1625 System](#), *ApJ*, **877**
- Lorenzo-Oliveira, D., Meléndez, J., Yana Galarza, J., Ponte, G., *et al.*, 2019, [Constraining the Evolution of Stellar Rotation Using Solar Twins](#), *MNRAS*, **485**
- Carlos, M., Meléndez, J., Spina, L., dos Santos, L., *et al.*, 2019, [The Li-Age Correlation: The Sun Is Unusually Li Deficient for Its Age](#), *MNRAS*, **485**, 4052
- Ford, E., **Bedell, M.**, Ciardi, D., Dodson-Robinson, S., *et al.*, 2019, [Advanced Statistical Modeling of Ground-Based RV](#)

Surveys as Critical Support for Future NASA Earth-Finding Missions, Astro2020: Decadal Survey on Astronomy and Astrophysics, **2020**, 466

- The MSE Science Team, Babusiaux, C., Bergemann, M., Burgasser, A., *et al.*, 2019, *The Detailed Science Case for the Maunakea Spectroscopic Explorer, 2019 Edition*, arXiv e-prints
- Luger, R., **Bedell, M.**, Vanderspek, R., & Burke, C., 2019, *TESS Photometric Mapping of a Terrestrial Planet in the Habitable Zone: Detection of Clouds, Oceans, and Continents*, arXiv e-prints
- Bergemann, M., Huber, D., Adibekyan, V., Angelou, G., *et al.*, 2019, *Stellar Astrophysics and Exoplanet Science With the Maunakea Spectroscopic Explorer (MSE)*, arXiv e-prints
- Botelho, R., Milone, A., Meléndez, J., **Bedell, M.**, *et al.*, 2019, *Thorium in Solar Twins: Implications for Habitability in Rocky Planets*, MNRAS, **482**, 1690
- Mingarelli, C., Anderson, L., **Bedell, M.**, Spergel, D., & Moran, A., 2018, *Improving Binary Millisecond Pulsar Distances With Gaia*, arXiv e-prints
- Lorenzo-Oliveira, D., Freitas, F., Meléndez, J., **Bedell, M.**, *et al.*, 2018, *The Solar Twin Planet Search. The Age-Chromospheric Activity Relation*, Astronomy and Astrophysics, **619**
- **Beane, A.***, Ness, M., & **Bedell, M.**, 2018, *Actions Are Weak Stellar Age Indicators in the Milky Way Disk*, ApJ, **867**, 31
- Crossfield, I., Guerrero, N., David, T., Quinn, S., *et al.*, 2018, *A TESS Dress Rehearsal: Planetary Candidates and Variables From K2 Campaign 17*, The Astrophysical Journal Supplement Series, **239**, 5
- **Bedell, M.**, Bean, J., Meléndez, J., Spina, L., *et al.*, 2018, *The Chemical Homogeneity of Sun-Like Stars in the Solar Neighborhood*, ApJ, **865**, 68
- Spina, L., Meléndez, J., Karakas, A., dos Santos, L., *et al.*, 2018, *The Temporal Evolution of Neutron-Capture Elements in the Galactic Discs*, MNRAS, **474**, 2580
- dos Santos, L., Meléndez, J., **Bedell, M.**, Bean, J., *et al.*, 2017, *Spectroscopic Binaries in the Solar Twin Planet Search Program: From Substellar-Mass to M Dwarf Companions*, MNRAS, **472**, 3425
- Gandolfi, D., Barragán, O., Hatzes, A., Fridlund, M., *et al.*, 2017, *The Transiting Multi-Planet System HD 3167: A 5.7 M_⊕ Super-Earth and an 8.3 M_⊕ Mini-Neptune*, AJ, **154**, 123
- **Bedell, M.**, Bean, J., Meléndez, J., Mills, S., *et al.*, 2017, *Kepler-11 Is a Solar Twin: Revising the Masses and Radii of Benchmark Planets via Precise Stellar Characterization*, ApJ, **839**, 94
- Malik, M., Grosheintz, L., Mendonça, J., Grimm, S., *et al.*, 2017, *HELIOS: An Open-Source, GPU-accelerated Radiative Transfer Code for Self-Consistent Exoplanetary Atmospheres*, AJ, **153**, 56
- Meléndez, J., **Bedell, M.**, Bean, J., Ramírez, I., *et al.*, 2017, *The Solar Twin Planet Search. V. Close-In, Low-Mass Planet Candidates and Evidence of Planet Accretion in the Solar Twin HIP 68468*, Astronomy and Astrophysics, **597**
- Barragán, O., Grziwa, S., Gandolfi, D., Fridlund, M., *et al.*, 2016, *EPIC 211391664b: A 32 M_⊕ Neptune-Size Planet in a 10 Day Orbit Transiting an F8 Star*, AJ, **152**, 193
- dos Santos, L., Meléndez, J., do Nascimento, J., **Bedell, M.**, *et al.*, 2016, *The Solar Twin Planet Search. IV. The Sun as a Typical Rotator and Evidence for a New Rotational Braking Law for Sun-Like Stars*, Astronomy and Astrophysics, **592**
- Tucci Maia, M., Ramírez, I., Meléndez, J., **Bedell, M.**, *et al.*, 2016, *The Solar Twin Planet Search. III. The [Y/Mg] Clock: Estimating Stellar Ages of Solar-Type Stars*, Astronomy and Astrophysics, **590**
- **Bedell, M.**, Meléndez, J., Bean, J., Ramírez, I., *et al.*, 2015, *The Solar Twin Planet Search. II. A Jupiter Twin Around a Solar Twin*, Astronomy and Astrophysics, **581**
- Meléndez, J., Bean, J., **Bedell, M.**, Ramírez, I., *et al.*, 2015, *Using Solar Twins to Explore the Planet-Star Connection With Unparalleled Precision*, The Messenger, **161**, 28
- Ramírez, I., Meléndez, J., Bean, J., Asplund, M., *et al.*, 2014, *The Solar Twin Planet Search. I. Fundamental Parameters of the Stellar Sample*, Astronomy and Astrophysics, **572**
- **Bedell, M.**, Meléndez, J., Bean, J., Ramírez, I., *et al.*, 2014, *Stellar Chemical Abundances: In Pursuit of the Highest Achievable Precision*, ApJ, **795**, 23
- Meléndez, J., Ramírez, I., Karakas, A., Yong, D., *et al.*, 2014, *18 Sco: A Solar Twin Rich in Refractory and Neutron-Capture Elements. Implications for Chemical Tagging*, ApJ, **791**, 14
- Monroe, T., Meléndez, J., Ramírez, I., Yong, D., *et al.*, 2013, *High Precision Abundances of the Old Solar Twin HIP 102152: Insights on Li Depletion From the Oldest Sun*, ApJ, **774**

- **Bedell, M.**, Villaume, A., Weiss, L., Sliski, D., *et al.*, 2011, [Monitoring H \$\alpha\$ Emission and Continuum of UXORs: RR Tauri](#), AJ, **142**, 164