Gavin Wang

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Education

Johns Hopkins University, Baltimore, MD, USA — August 2022 – May 2026 (expected)
Bachelor of Science in Physics, GPA 3.92 / 4.00

Research Experience

Astrophysics Intern, Carnegie Observatories — June 2025 – present
Mentor: Dr. Jessica Spake

- Analyzing high-resolution spectra from Magellan/MIKE on a hot Jupiter with an escaping tail

Summer Undergraduate Research Fellow, California Institute of Technology — June 2024 – present
Mentors: Dr. Jerry Xuan, Prof. Dimitri Mawet

- Analyzed high-resolution spectra from the Keck Planet Imager and Characterizer of a low mass L dwarf
- Used radiative transfer models and high-performance computing to measure atmospheric abundances
- First-author paper in preparation

James Webb Space Telescope Research Intern, Space Telescope Science Institute — October 2023 – present
Mentor: Dr. Néstor Espinoza

- Using Bayesian statistics and wavelet analysis to reduce 1/f noise for JWST's near-infrared detectors
- Tests on synthetic data show 15% reduction in noise compared to existing algorithms
- Developed C and Python code for whitening 1/f noise
- First-author paper in preparation

Research Intern, Johns Hopkins University — April 2023 – May 2025
Mentors: William Balmer, Prof. David Sing

- Used WIYN/NEID radial velocity data and Transiting Exoplanet Survey Satellite (TESS) photometry to measure the density of HAT-P-67 b
- Found HAT-P-67 b to be the largest and second lowest-density hot planet known to date
- First-author paper published in *The Astronomical Journal*

Undergraduate Researcher, Space Telescope Science Institute — January 2022 – December 2023
Mentor: Dr. Néstor Espinoza

- Searched for transit depth variability among a sample of 330 exoplanets using TESS data
- Used transit photometry fitting, periodogram analysis, and parallel processing
- First-author paper published in *The Astronomical Journal*

Junior Member, TESS Follow-up Observing Program — July 2020 – January 2022
Mentor: Dr. Karen Collins

- Helped identify 12 extrasolar planets from 100+ datasets collected by the Las Cumbres Observatory
- 24 co-author publications (2021 – 2025)

Select Coursework

Physics: Classical Mechanics I/II, Special Relativity & Waves, Quantum Mechanics I/II, Statistical Physics

Astronomy: Intro to Galaxies and AGN, Physical Cosmology, Observational Astronomy, Radiative Astrophysics

Math: Methods of Complex Analysis, Honors Algebra I, Probability, Real Analysis I

Honors & Awards

Astronaut Scholarship, Astronaut Scholarship Foundation May 2025
Awarded annually to 70+ of the brightest and most talented college students in science, technology, engineering and mathematics

Barry M. Goldwater Scholarship, Goldwater Foundation March 2025
Supports students who show exceptional promise of becoming the Nation's next generation of research leaders

Maryland Sellinger Scholarship, JHU December 2024
Donor-funded scholarship recipient

ΣΠΣ, JHU Chapter May 2024
Inducted into honor society in recognition of outstanding scholarship in physics and astronomy

Summer Undergraduate Research Fellowship, Caltech April 2024
$7,740 award for conducting a ten-week summer research project

Dean's List, JHU Spring 2023 – present

Provost's Undergraduate Research Award, JHU October 2022
$3,000 award; one of 25 selected research proposals out of 137

Successful Proposals

Co-Investigator, "Direct Detection and Characterization of a Nearby Temperate Giant Planet" 2025
Awarded 47.3 hours for JWST Cycle 4 (GO 6915)

Principal Investigator, "Unlocking the periods and masses of two young long-period planets" 2025
Awarded 23 hours on Miniature Exoplanet Radial Velocity Array-Australis

Co-Investigator, "Synergistic Cool Star Monitoring" 2024
Awarded 14.5 hours on Apache Point Observatory ARC 3.5-meter Telescope

Posters/Talks

TESS Science Conference III *(poster)* August 2024
"A Blind Search for Transit Depth Variability with TESS"

JHU Undergraduate Research Showcase *(poster)* April 2024
"A Blind Search for Transit Depth Variability with TESS"

TESS Science Talks @ MIT *(invited talk)* March 2024
"Searching for Transit Depth Variability with TESS"

JHU DREAMS Conference *(poster)* October 2023
"A Blind Search for Transit Depth Variability with TESS"

54th Annual Meeting of the AAS Division for Planetary Sciences *(poster)* October 2022
"Constraints on Transit Depth Variations of Known Exoplanets with TESS"

53rd Annual Meeting of the AAS Division for Planetary Sciences *(poster)* October 2021
"Developing a Tool to Automate the Search for NEBs Among TOIs"

TESS Science Conference II *(poster)* August 2021
"Analyzing FFIs to Identify False Positives within TESS Candidates"

Society for Astronomical Sciences 2021 Symposium on Telescope Science *(poster)* June 2021
"Eclipsing Binaries Identified Through the TESS Follow-up Observing Program"

Refereed Publications

First-author publications:

1. **Wang**, Balmer, Pueyo et al., "A Revised Density Estimate for the Largest Known Exoplanet, HAT-P-67 b," *The Astronomical Journal* (2025), 169, 336.
2. **Wang**, Espinoza, "A Blind Search for Transit Depth Variability with TESS," *The Astronomical Journal* (2024), 167, 1.

Select co-authored publications: see Google Scholar for full list; 27 publications and 485 citations

1. Christian, Vanderburg, Becker et al. (including **Wang**), "Wide Binary Orbits Are Preferentially Aligned with the Orbits of Small Planets, but Probably Not Hot Jupiters," *The Astronomical Journal* (2025), 169, 308.
2. Armstrong, Osborn, Burn et al. (including **Wang**), "The NCORES Program: Precise planetary masses, null results, and insight into the planet mass distribution near the radius gap," *Monthly Notices of the Royal Astronomical Society* (2025), 537, 3175.
3. Masuda, Libby-Roberts, Livingston et al. (including **Wang**), "A Fourth Planet in the Kepler-51 System Revealed by Transit Timing Variations," *The Astronomical Journal* (2024), 168, 294.
4. Schulte, Rodriguez, Bieryla et al. (including **Wang**), "Migration and Evolution of giant ExoPlanets (MEEP). I. Nine newly confirmed hot Jupiters from the TESS mission," *The Astronomical Journal* (2024), 168, 32.
5. Zhang, Weiss, Huber et al. (including **Wang**), "Dynamical Architectures of S-type Transiting Planets in Binaries. I. Target Selection Using Hipparcos and Gaia Proper Motion Anomalies," *The Astronomical Journal* (2024), 167, 89.
6. Yahalomi, Kipping, Nesvorný et al. (including **Wang**), "Not-so-fast Kepler-1513: a perturbing planetary interloper in the exomoon corridor," *Monthly Notices of the Royal Astronomical Society* (2024), 527, 620.
7. Peterson, Benneke, Collins et al. (including **Wang**), "A temperate Earth-sized planet with tidal heating transiting an M6 star," *Nature* (2023), 617, 701.
8. Persson, Georgieva, Gandolfi et al. (including **Wang**), "TOI-2196 b: Rare planet in the hot Neptune desert transiting a G-type star," *Astronomy & Astrophysics* (2022), 666, A184.
9. Chontos, Murphy, MacDougall et al. (including **Wang**), "The TESS-Keck Survey: Science Goals and Target Selection," *The Astronomical Journal* (2022), 163, 297.
10. Christian, Vanderburg, Becker et al. (including **Wang**), "A Possible Alignment Between the Orbits of Planetary Systems and their Visual Binary Companions," *The Astronomical Journal* (2022), 163, 207.
11. Winters, Cloutier, Medina et al. (including **Wang**), "A Second Planet Transiting LTT 1445A and a Determination of the Masses of Both Worlds," *The Astronomical Journal* (2022), 163, 168.
12. Kaye, Vissapragada, Günther et al. (including **Wang**), "Transit timings variations in the three-planet system: TOI-270," *Monthly Notices of the Royal Astronomical Society* (2022), 510, 5464.
13. Grunblatt, Saunders, Sun et al. (including **Wang**), "TESS Giants Transiting Giants. II. The Hottest Jupiters Orbiting Evolved Stars," *The Astronomical Journal* (2022), 163, 120.
14. Giacalone, Dressing, Hedges et al. (including **Wang**), "Validation of 13 Hot and Potentially Terrestrial TESS Planets," *The Astronomical Journal* (2022), 163, 99.
15. Scarsdale, Murphy, Batalha et al. (including **Wang**), "TESS-Keck Survey. V. Twin Sub-Neptunes Transiting the Nearby G Star HD 63935," *The Astronomical Journal* (2021), 162, 215.

16. Gan, Bedell, Wang et al. (including **Wang**), "HD 183579b: a warm sub-Neptune transiting a solar twin detected by TESS," *Monthly Notices of the Royal Astronomical Society* (2021), 507, 2220.
17. Dong, Huang, Dawson et al. (including **Wang**), "Warm Jupiters in TESS Full-frame Images: A Catalog and Observed Eccentricity Distribution for Year 1," *The Astrophysical Journal Supplement Series* (2021), 255, 6.
18. Rodriguez, Quinn, Zhou et al. (including **Wang**), "TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full Frame Images," *The Astronomical Journal* (2021), 161, 194.

Teaching & Outreach

Learning Den Tutor, JHU — Fall 2023

- Personalized tutoring for General Physics I

Undergraduate Learning Assistant, JHU — Spring 2023 – Fall 2023

- Assisted for General Physics I (AS.171.101 and AS.171.107) weekly discussion sections
- Held weekly 2-hour office hours

***Hopkins Insider* Contributor**, JHU — May 2023

- Wrote blog post on my exoplanet research for prospective undergraduates

Attended Workshops

Exoplanet Jamboree, STScI — November 2024
One-day workshop on exoplanet, brown dwarf, and planet formation research at STScI & JHU

Sagan Summer Workshop, NASA Exoplanet Science Institute — July 2024
Advances in Direct Imaging: From Young Jupiters to Habitable Earths

Skills

- Languages: English (native), Chinese (native)
- Computing: Python (5+ years), C/C++, Linux, HPC
- Software: `AstroImageJ`, `Astropy`, `Anaconda`, `Matplotlib`, `NumPy`, `SciPy`, `dynesty`, `corner`, `emcee`, `Ray`
- Astronomy: 80 hours experience operating 0.5m Morris W. Offit Telescope