

# Jiayin (DJ) Dong

Flatiron Research Fellow

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## Current Position

### Flatiron Research Fellow

Center for Computational Astrophysics, Flatiron Institute – Simons Foundation

New York, NY

July 2022 – now

## Education

### Pennsylvania State University

Ph.D. in Astronomy & Astrophysics; Ph.D. minor in Computational Science

M.S. in Astronomy & Astrophysics

State College, PA

August 2022

April 2019

### University of Illinois at Urbana-Champaign

B.S. in Engineering Physics and Astronomy (dual degree) with honors

Champaign, IL

May 2017

## Fellowships & Awards

- 2022–25 **Flatiron Research Fellowship** Postdoctoral fellowship at CCA, Flatiron Institute
- 2022 **Alumni Association Dissertation Award** The most prestigious recognition to Penn State doctorate students
- 2021 **Raynor L. Duncombe Student Research Prize** Awarded by AAS Division on Dynamical Astronomy
- 2018–20 **Zaccheus Daniel Fellowship (x3)** Penn State travel grants for graduate student research
- 2020 **CCA Pre-Doctoral Fellowship** Selected as a predoc fellow at CCA, Flatiron Institute in Spring 2020
- 2019 **Student Poster Competition Winner** at New Horizons in Planetary Systems Conference
- 2018 **Sagan Workshop Travel Award** Travel support for 2018 Sagan Exoplanet Summer Workshop
- 2017 **Homer F. Braddock Fellowship** University scholarship awarded to selected 1st-year graduate students
- 2014–17 **Edmund J. James Scholar** Undergraduate honor program at the University of Illinois

## Awarded Telescope Time

### As Principal Investigator

#### WIYN-3.5m / NEID via the NASA-NSF Exoplanet Observational Research Program (NN-EXPLORE)

2023A, #652300, Priority 0 and 1, **24.4 hours**

2023A, #954402, Priority 0, **17.8 hours**

2022A, #413894, Priority 1 and 2, **16.7 hours (NASA WIYN Data Award)**

2021B, #0277, Priority 1 and 2, **5 hours**

#### CT-1.5m / CHIRON via NN-EXPLORE

2022A, #308148, **50 hours**

2021A, #0147, **60 hours**

2020B, #0189, **20 hours**

#### MINERVA-A / MINERVA via NN-EXPLORE

2022A, #308148, **20 hours**

2021A, #0147, **40 hours**

#### LCOGT-1m via NOIRLab

2021A, #0147, **50 hours**

2020B, #0189, **30 hours**

**WIYN-3.5m / NEID** via the Penn State TAC

2022B, #836442, Priority 3 and 4, **4.4 hours**

2021B, #0448, Priority 2, **10.5 hours**

2021A, #0405, Priority 1 and 2, **9.6 hours**

2021A, #0406, Priority 2, **4 hours**

**Co-investigator** on ESO-3.6m / HARPS, Magellan / MIKE, Magellan / PSF, WIYN-3.5m / NEID, WIYN-3.5m / NESSI

## Invited Talks/Seminars

- May 2023 **MIT TESS Science Talks** "Five Years into TESS: A Comprehensive View of the Origins of Close-In Giant Planets" Boston, MA
- Feb. 2023 **Princeton Exoplanet Seminar** "Understanding Close-in Planet Formation From Stellar Obliquities" Princeton, NJ
- Oct. 2022 **Yale Exoplanets and Stars Seminar** "Formation of Close-in Giant Planets: Where and How?" New Haven, Connecticut
- Feb. 2022 **Tsinghua Planet Group Meeting** "Origins of Warm Jupiters" Beijing, China
- Oct. 2021 **Princeton Exoplanet Seminar** "Tracing Dynamical Evolution of Planetary Systems" Princeton, NJ
- Oct. 2021 **Caltech Planetary Science Seminar** "Tracing Dynamical Evolution of Planetary Systems" Pasadena, CA
- Oct. 2021 **Berkeley Center for Integrative Planetary Science Seminar** "Tracing Dynamical Evolution of Planetary Systems" Berkeley, CA (Virtual)
- Oct. 2021 **Carnegie EPL Astronomy Seminar** "Tracing Dynamical Evolution of Planetary Systems" Washington, D.C. (Virtual)
- Sep. 2021 **CfA Seminar** "Tracing Dynamical History of TESS Warm Jupiters" Boston, MA (Virtual)
- Jan. 2020 **Tsinghua Planet Group Meeting** "Debris Disks in Multi-Planet Systems+TESS Warm Jupiters" Beijing, China

## Contributed Conference Talks

- Oct. 2022 **TESS Science Meeting 29** "Using the NEID spectrograph to confirm the planetary nature of TOI-1859b via the Rossiter-McLaughlin effect" Boston, MA
- June 2022 **The 240th AAS Meeting** "Tracing Dynamical Evolution of Planetary Systems" Pasadena, CA (**Dissertation talk**)
- April 2022 **The 53rd DDA Meeting** "Two Case Studies of Warm Jupiters Suggesting Different Origins" New York, NY
- May 2021 **The 52nd DDA Meeting** "Boundary Layer Circumplanetary Accretion: How Fast Could an Unmagnetized Planet Spin Up Through Its Disk?" (Virtual, **Duncombe Prize Winner**)
- Jan. 2021 **TESS Science Meeting 24** "Warm Jupiters in Year 1 TESS Full-Frame Images: A Catalog and Observed Eccentricity Distribution" Boston, MA (Virtual)
- Nov. 2020 **Exoplanet Demographics I** "The Eccentricity Distribution and Occurrence Rates of Warm, Large Exoplanets" Pasadena, CA (Virtual)
- Aug. 2020 **The 51st DDA Meeting** "Unraveling Warm, Large Exoplanet (WaLE) Origins From TESS Observations" Ithaca, NY (Virtual)
- July 2020 **Exoplanets III** "A Catalog of Warm, Large Exoplanet (WaLE) candidates discovered in TESS Full Frame Images" Heidelberg, Germany (Virtual)
- June 2019 **Emerging Researchers in Exoplanet Science V** "Probing Young Planetary Systems from Their Debris Disks: Are Our Inferences Compromised by Unseen Planets?" Ithaca, NY
- June 2018 **Emerging Researchers in Exoplanet Science IV** "Investigating Young Planetary Systems Through Their Debris Disks" State College, PA

## Seminars

- Feb. 2023 **CCA Thursday Lunch Talk** "Close-in Giant Planets: Where, When, and How Do They Form?" New York, NY
- June 2020 **CCA Pre-Doctoral Symposium** "Angular Momentum Transport in Circumplanetary Disks: How Much Could an Unmagnetized Planet Spin up Through Its Disk?" New York, NY (Virtual)
- Nov. 2019 **Penn State Astronomy Lunch Talk** "Detection and Characterization of Warm Jupiters in TESS Full-Frame Images" State College, PA
- Jan. 2019 **Penn State Astronomy Lunch Talk** "Probing Young Planetary Systems from Their Debris Disks: Are We Messed up by Unseen Planets?" State College, PA
- Sep. 2017 **Penn State Astronomy Lunch Talk** "An ALMA Continuum Survey of the Protoplanetary Disks in the  $\rho$ -Ophiuchus Molecular Cloud" State College, PA

## Contributed Conference Posters

- May 2022 **Exoplanets IV** "Two Case Studies of Warm Jupiters Suggesting Different Origins" Las Vegas, NV
- Aug. 2021 **TESS Science Conference II** "The Eccentricity Distribution, Occurrence Rates, and Companions of TESS Warm Jupiters" Cambridge, MA (Virtual)
- May 2021 **Emerging Researchers in Exoplanet Science VI** "In Situ versus Disk Migration Origins of Warm Jupiters: Prediction on Nearby Companions" (Virtual)
- May 2021 **The 52nd DDA Meeting** "In Situ versus Disk Migration Origins of Warm Jupiters: Prediction on Nearby Companions" (Virtual)
- Aug. 2019 **Extreme Solar Systems IV** "Probing Young Planetary Systems from Their Debris Disks: Are Our Inferences Compromised by Unseen Planets?" Reykjavik, Iceland
- July 2019 **TESS Science Conference I** "Detection and Characterization of TESS Warm Jupiters" Cambridge, MA
- May 2019 **New Horizons in Planetary Systems** "Probing Young Planetary Systems from Their Debris Disks: Are Our Inferences Compromised by Unseen Planets?" Victoria, BC (**Poster Prize Winner**)
- July 2018 **Sagan Exoplanet Summer Workshop** "Investigating Young Planetary Systems Through Their Debris Disks" Pasadena, CA
- Apr. 2016 **University of Illinois Image of Research** "Substructures of Protoplanetary Disks Revealed with ALMA Radio Observations" Champaign, IL

## Teaching Experience

### Visiting Lecturer

LSSTC Data Science Fellowship Program

Chicago, IL  
2022

- Gave lectures on **Bayesian inference**, **sampling methods**, and **PyMC applications** to fellow graduate students in the Large Synoptic Survey Telescope Corporation (LSSTC) Data Science Fellowship Program (DSFP). 

### Graduate Teaching Assistant

Elementary Astronomy; Fundamental of Planetary Science and Astronomy

State College, PA  
2017, 18

- TA responsibilities including grading assignments, offering office hours, and proctoring exams
- Two guest lectures to roughly 150 students on **"The Solar System Formation"**
- One guest lecture to 5 students on **"Elementary Astronomy Lab"**

### Grader and Observation Assistant

Introduction to Astrophysics

Champaign, IL  
2016, 17

- Graded homework and exams for sophomore undergraduate students in Astronomy major
- Set up telescopes, monitored telescopes for safe use by students, and discussed celestial objects being observed during the evening and solar observing sessions

## Mentoring

- 2022–now **Kyle Hixenbaugh** (with Dr. Wang), graduate student at Indiana University  
2021–22 **Claire DiPerna** (with Dr. Dawson), undergraduate student at Penn State  
2021–22 **Jonathon Hope** (with Dr. Dawson), undergraduate student at Penn State

## Professional & Outreach Activity

- 202x **Panelist** served on the TESS General Investigator (GI) program  
2023 **Consultant** of the 8th Emerging Researchers in Exoplanet Science (ERES) symposium to be hosted at Yale  
2022 **Chair** of the Organizing Committee for the 7th Emerging Researchers in Exoplanet Science (ERES) symposium; Gathered **\$100,000** meeting funds from the Heising-Simons Foundation; 80+ in-person participants  
2022, 17–19 **Featured Speaker; Exploring Exoplanets Demonstrator; The Guardian of Kid Prizes** at AstroFest (4-night outreach, 2500+ public visitors) & Astronight (1-night outreach, 500+ students)  
2022 **Astronomy on Tap Speaker** Live coding Solar System dynamical interactions using N-body integrators  
2021 **Sagan Workshop Hands-on Session Helper** Facilitated hands-on session at Sagan workshop 2021  
2021 **Organizing Committee** for the 6th Emerging Researchers in Exoplanet Science symposium; Organized discussion panels for career development and public engagement in astronomy  
2020 **Panelist** on the Graduate School Information Session for Penn State undergraduate students  
2020 **Moderator** for Exoplanets III; 950+ online participants; Coordinated with Transits 1 & 2 sessions  
Fall 2019 **CEHW Journal Club Organizer** Organized weekly Astro-ph.EP group discussion for the Center for Exoplanets and Habitable Worlds (CEHW)  
2019 **Executive Secretary** of NASA XRP Review Panel  
2018 **Organizing Committee** for the 4th Emerging Researchers in Exoplanet Science symposium; Involved in abstract selection and conference scheduling; Chaired the **Planet Formation & Evolution** session; Organized excursions

## Press Release

- 2023 **“New ‘warm Jupiter’ exoplanet has a weird orbit and another planet may be to blame”** Press release of TOI-1859b by space.com and phys.org (**Dong**, Wang, Rice+23, ApJL)  
2023 **“Hot Days and Cloudy Nights on a ‘Heavy Metal’ Exoplanet”** Highlighted by AAS Nova (Mikal-Evans, Sing, **Dong**+23, ApJL)  
2021 **“Worlds Away”** Featured by the Simons Foundation 2021 Annual Report (**Dong**, Jiang, Armitage 21, ApJ)  
2021 **“Newly discovered gas giant moving closer to its star”** Press release of TOI-3362b by the Eberly College Science News, MINERVA-Australis Press, & ABC Southern Queensland (**Dong**, Huang, Zhou+21, ApJL)  
2021 **AAS Journal Author Series** Interviewed with AAS Editor Frank Timmes about the TESS Warm Jupiter catalog and statistics (**Dong**, Huang, Dawson+21, ApJS)  
2020 **“Detail in the Debris”** Featured by the Eberly College Science Journal Winter Edition (**Dong**, Dawson, Shannon+20, ApJ)

## Refereed Publications

### 1st-author publications

- [7] **Dong** & Foreman-Mackey 2023, "A Hierarchical Bayesian Framework for Inferring the Stellar Obliquity Distribution", AJ in press
- [6] **Dong**, Wang, Rice, et al. 2023, "TOI-1859b: A 64-Day Warm Jupiter on an Eccentric and Misaligned Orbit", ApJL in press
- [5] **Dong**, Huang, Zhou, Dawson, et al. 2022, "NEID Rossiter-McLaughlin Measurement of TOI-1268b: A Young Warm Saturn Aligned with Its Cool Host Star", ApJL, **926**, L7 (12pp)
- [4] **Dong**, Jiang & Armitage 2021, "Boundary Layer Circumplanetary Accretion: How Fast Could an Unmagnetized Planet Spin Up Through Its Disk?", ApJ, **921**, 54 (15pp)
- [3] **Dong**, Huang, Zhou, Dawson, et al. 2021, "TOI-3362b: A Proto-Hot Jupiter Undergoing High-Eccentricity Tidal Migration", ApJL, **920**, L16 (11pp)
- [2] **Dong**, Huang, Dawson, Foreman-Mackey, et al. 2021, "Warm Jupiters in TESS Full-Frame Images: A Catalog and Observed Eccentricity Distribution for Year 1", ApJS, **255**, 6 (25pp)
- [1] **Dong**, Dawson, Shannon, & Morrison 2020, "Debris Disks in Multi-Planet Systems: Are Our Inferences Compromised by Unseen Planets?", ApJ, **889**, 47 (19pp)

### 2nd/3rd-author publications

- [1] Mikal-Evans, King, **Dong**, Foreman-Mackey, et al. 2023, "A JWST NIRSpec Phase Curve for WASP-121b: Dayside Emission Strongest Eastward of the Substellar Point and Nightside Conditions Conducive to Cloud Formation", ApJL, **943**, 17

### 4th+-author publications

- [11] Gupta et al. incl. **Dong** 2023, "A High-Eccentricity Warm Jupiter Orbiting TOI-4127", AJ, **165**, 234
- [10] Heitzmann et al. incl. **Dong** 2023, "TOI-4562b: A Highly Eccentric Temperate Jupiter Analog Orbiting a Young Field Star", ApJ, **165**, 121
- [9] Frazier et al. incl. **Dong** 2023, "NEID Reveals that The Young Warm Neptune TOI-2076 b Has a Low Obliquity", ApJL, **944**, 41
- [8] Bowens, Shannon, Dawson, **Dong** 2023, "Longterm Stability of Planetary Systems Formed from a Transitional Disk", ApJ, **944**, 201
- [7] Jackson, Dawson, Quarles, **Dong** 2023, "Statistical Analysis of the Dearth of Super-eccentric Jupiters in the Kepler Sample", AJ, **165**, 82
- [6] Kanodia et al. incl. **Dong** 2022, "TOI-3757b: A Low-density Gas Giant Orbiting a Solar-metallicity M Dwarf", AJ, **164**, 81
- [5] Stefansson et al. incl. **Dong** 2022, "The Warm Neptune GJ 3470b has a Polar Orbit", ApJL, **931**, L15
- [4] Foreman-Mackey et al. incl. **Dong** 2021, "exoplanet: Gradient-based Probabilistic Inference for Exoplanet Data & Other Astronomical Time Series", JOSS, **6**, 3285
- [3] Dawson et al. incl. **Dong** 2021, "Precise Transit and Radial-Velocity Characterization of a Resonant Pair: A Warm Jupiter TOI-216c and Eccentric Warm Neptune TOI-216b", AJ, **161**, 161
- [2] Kanodia et al. incl. **Dong** 2020, "TOI-1728b: The Habitable-zone Planet Finder Confirms a Warm Super Neptune Orbiting an M Dwarf Host", ApJ, **899**, 1
- [1] McFarquhar et al. incl. **Dong** 2017, "Processing of Cloud In-Situ Data Collected by Bulk Water, Scattering and Imaging Probes: Fundamentals, Uncertainties and Efforts towards Consistency", Meteorological Monographs, **11.1**