Jiayin (DJ) **Dong**

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Current Position

Flatiron Research Fellow — New York, NY
Center for Computational Astrophysics, Flatiron Institute – Simons Foundation — July 2022–Present

Education

Pennsylvania State University — State College, PA
Ph.D. in Astronomy & Astrophysics; Ph.D. minor in Computational Science — August 2022
M.S. in Astronomy & Astrophysics — April 2019

University of Illinois at Urbana-Champaign — Champaign, IL
B.S. in Engineering Physics and Astronomy (dual degree) with honors — 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

I led 12 observing programs as Principal Investigator, and was awarded over 45 nights.

WIYN-3.5m / NEID via the NASA-NSF Exoplanet Observational Research Program (NN-EXPLORE)
- 2024A–2025B (**Long Term Program**), #536482
  - 2024A, Priority 3, **39 hours**
  - 2024B, **33 hours** (scheduled)
  - 2025A, **13 hours** (scheduled)
  - 2025B, **10 hours** (scheduled)
- 2023A, #954402, Priority 0, **17.8 hours** (**NASA WIYN Data Award**)
- 2023A, #652300 (co-PI Chontos), Priority 0 and 1, **24.4 hours**
- 2022A, #413894, Priority 1 and 2, **16.7 hours** (**NASA WIYN Data Award**, $6,000)
- 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**

As Co-Investigator on VLT-8m / ESPRESSO, ESO-3.6m / HARPS, TNG-3.6m / HARPS-N, Magellan-6.5m / MIKE, Magellan-6.5m / PSF, WIYN-3.5m / NEID, WIYN-3.5m / NESSI, CHEOPS

Invited Colloquia, Seminars, Talks

Mar. 2024 **Carnegie Observatories Colloquium** "Origins and Diversity of Giant Planets" Urbana, IL

Feb. 2024 **University of Illinois Urbana-Champaign Astrophysics Colloquium** "Origins and Diversity of Giant Planets" Urbana, IL

Dec. 2023 **Nanjing University Exoplanet Seminar** "Five Years into TESS: A Comprehensive View of the Origins of Close-In Giant Planets" Nanjing, China

Nov. 2023 **Columbia Seminar** "Uncovering the Origins of Close-In Giant Planets through Stellar Obliquity" New York, NY

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

Mar. 2024 **Extreme Solar Systems V** "Deciphering Origins of Close-in Gas Giants through Stellar Obliquity Distribution" Christchurch, New Zealand

Jan. 2024 **ExoNYC** "From Super Earths to Super Jupiters: What stellar obliquity tells us about their formation" New York, New York

Dec. 2023 **Exoplanets & Planet Formation Workshop** "Deciphering Origins of Hot Jupiters through Stellar Obliquity Distribution" Beijing, China

Dec. 2023 **Open Problems in the Astrophysics of Gas Giants** "Deciphering Origins of Close-in Gas Giants through Stellar Obliquity Distribution" Patagonia, Chile

July 2023 **Other Worlds Laboratory Summer Program** "Hot Jupiters: Dynamical Imprints Meet Atmospheric Mysteries" Santa Cruz, CA

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 ρ-Ophiuchus Molecular Cloud" State College, PA

Contributed Conference Posters

June 2023 **Gordon Research Conference** "Stellar Obliquity Distribution of Exoplanetary Systems" South Hadley, MA

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

Fluid Dynamics Summer School Lecturer New York, NY

Flatiron Computational Fluid Dynamics for Astrophysics Summer School 2023

- Gave a lecture about the application of grid-based code Athena++ in planet formation

LSSTC DSFP Visiting Lecturer Chicago, IL

LSSTC Data Science Fellowship Program 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).

Sagan Workshop Hands-on Session Helper Virtual

Sagan Exoplanet Summer Workshop 2021

- Led the hands-on session on circumstellar disk modeling using RADMC-3D (written by Faramaz et al.) in Zoom break-out rooms
- Facilitated students to complete coding exercises

Graduate Teaching Assistant State College, PA

Elementary Astronomy; Fundamental of Planetary Science and Astronomy 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 Champaign, IL

Introduction to Astrophysics 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 Experience

Graduate students

2024– **Brandon Radzom**, Indiana University '26, "Stellar obliquity of multi-planet systems", co-mentored with Prof. Songhu Wang

2023– **Allyson Bieryla**, University of Southern Queensland '25, "Stellar obliquity measurement of TOI-2005", co-mentored with Profs. George Zhou and Chelsea Huang

2022–23 **Kyle Hixenbaugh**, Indiana University '23, "Stellar obliquity measurement of TOI-5143", co-mentored with Prof. Songhu Wang

Undergraduate students

2024– **Tyler Fairnington**, University of Southern Queensland '25, "Eccentricity Distribution of TESS Planets", co-mentored with Prof. Chelsea Huang

2021–22 **Claire DiPerna**, Penn State '24, "Dynamics of the resonant-chain system", co-mentored with Prof. Bekki Dawson

2021–22 **Jonathon Hope**, Penn State '24, "Migration of multiple giant planets", co-mentored with Prof. Bekki Dawson

DEI, Outreach & Professional Activities

Core Organizer of the Emerging Researchers in Exoplanet Science (ERES) Symposium

2023 **Consultant for the 8th ERES Symposium (@Yale)** Provided expertise and guidance for the successful hosting of the ERES Symposium at Yale, drawing over 100+ in-person participants. This event contributed to the continued growth and development of emerging researchers in exoplanet science.

2022 **Chair of Organizing Committee for the 7th ERES Symposium (@Penn State)** Led the organization of the ERES Symposium at Penn State, securing **$100,000** in meeting funds from the Heising-Simons Foundation. The event brought together over 80 in-person participants, creating a platform for knowledge exchange and networking among junior researchers in the field of exoplanet science.

2021 **Organizing Committee Member for the 6th ERES Symposium (@Princeton)** Organized discussion panels focusing on career development and public engagement in astronomy. These panels served as a valuable resource for attendees, providing insights into career paths and ways to engage with the broader public.

2018 **Organizing Committee Member for the 4th ERES Symposium (@Penn State)** Involved in abstract selection and conference scheduling. Chaired the Planet Formation & Evolution session. Organized excursions, enhancing the overall experience of the conference participants.

Outreach

2024 **Solar Viewing Volunteer** Delivering solar viewing sessions for parkgoers at Madison Square Park before the 2024 Total Solar Eclipse

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

Service

2023– **Journal Referee** for AJ (x2), A&A (x1), & PASP (x1)

2023 **External Panelist** served on CanTAC for the CFHT proposal

2023 **Review Panelist** served on the TESS General Investigator (GI) program

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

Media & Press Release

2023 **"New 'warm Jupiter' exoplanet has a weird orbit and another planet may be to blame"** Press release of the discovery of TOI-1859b by the **Space.com; phys.org** (**Dong**, Wang, Rice+23, ApJL)

2023 **"Hot Days and Cloudy Nights on a 'Heavy Metal' Exoplanet"** Press release of the JWST phase curve of WASP-121b by the **AAS Nova** (Mikal-Evans, Sing, **Dong**+23, ApJL)

2021 **"Worlds Away"** Featured article on circumplanetary accretion by the **Simons Foundation Annual Report** (**Dong**, Jiang, & Armitage 21, ApJ)

2021 **"Newly discovered gas giant moving closer to its star"** Press release of the discovery of TOI-3362b by the **ABC Southern Queensland; MINERVA-Australis Press; Eberly College Science News** (**Dong**, Huang, Zhou+21, ApJL)

2021 **AAS Journal Author Series** Interviewed by AAS Editor Frank Timmes about the TESS Warm Jupiter catalog and statistics (**Dong**, Huang, Dawson+21, ApJS)

2020 **"Detail in the Debris"** Featured article on debris disk modeling by the **Eberly College Science Journal** (**Dong**, Dawson, Shannon+20, ApJ)

Refereed Publications

1st-Author Publications

[1] **Dong** & Foreman-Mackey 2023, "A Hierarchical Bayesian Framework for Inferring the Stellar Obliquity Distribution", AJ, **166**, 112

[2] **Dong**, Wang, Rice, et al. 2023, "TOI-1859b: A 64-Day Warm Jupiter on an Eccentric and Misaligned Orbit", ApJ Letter, **951**, L29

[3] **Dong**, Huang, Zhou, Dawson, et al. 2022, "NEID Rossiter-McLaughlin Measurement of TOI-1268b: A Young Warm Saturn Aligned with Its Cool Host Star", ApJ Letter, **926**, L7

[4] **Dong**, Jiang & Armitage 2021, "Boundary Layer Circumplanetary Accretion: How Fast Could an Unmagnetized Planet Spin Up Through Its Disk?", ApJ, **921**, 54

[5] **Dong**, Huang, Zhou, Dawson, et al. 2021, "TOI-3362b: A Proto-Hot Jupiter Undergoing High-Eccentricity Tidal Migration", ApJ Letter, **920**, L16

[6] **Dong**, Huang, Dawson, Foreman-Mackey, et al. 2021, "Warm Jupiters in TESS Full-Frame Images: A Catalog and Observed Eccentricity Distribution for Year 1", ApJ Supplement, **255**, 6

[7] **Dong**, Dawson, Shannon, & Morrison 2020, "Debris Disks in Multi-Planet Systems: Are Our Inferences Compromised by Unseen Planets?", ApJ, **889**, 47

2nd/3rd-Author Publications

[8] 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", ApJ Letter, **943**, 17

4th+-Author Publications

[9] Mikal-Evans et al. incl. **Dong** 2024, "Silicon monoxide in an ultrahot Jupiter atmosphere with a super-stellar C/O", Nature, under review

[10] Gupta, Millholland, Im, **Dong** 2024, "A hot Jupiter progenitor on a super-eccentric, retrograde orbit", Nature, under review

[11] Delamer et al. incl. **Dong**, et al. 2024, "TOI-4201: An Early M-dwarf Hosting a Massive Transiting Jupiter Stretching Theories of Core-Accretion", ApJ Letter under review

[12] Mantovan et al. incl. **Dong** 2024, "TOI-5398, the youngest compact multi-planet system composed of an inner sub-Neptune and an outer warm Saturn", A&A in press

[13] Bieryla et al. incl. **Dong** 2024, "TOI-4641b: An Aligned Warm Jupiter Orbiting a Bright (V=7.5) Rapidly Rotating F-star", MNRAS, **527**, 10955

[14] Lubin, Wang, Rice, **Dong**, et al. 2023, "The 40d Orbital Period Warm Jupiter Within a Compact System, TOI-1670 c, is Well-aligned", ApJ Letter, **959**, L5

[15] Gupta et al. incl. **Dong** 2023, "A High-Eccentricity Warm Jupiter Orbiting TOI-4127", AJ, **165**, 234

[16] Heitzmann et al. incl. **Dong** 2023, "TOI-4562b: A Highly Eccentric Temperate Jupiter Analog Orbiting a Young Field Star", ApJ, **165**, 121

[17] Frazier et al. incl. **Dong** 2023, "NEID Reveals that The Young Warm Neptune TOI-2076 b Has a Low Obliquity", ApJ Letter, **944**, 41

[18] Bowens, Shannon, Dawson, **Dong** 2023, "Longterm Stability of Planetary Systems Formed from a Transitional Disk", ApJ, **944**, 201

[19] Jackson, Dawson, Quarles, **Dong** 2023, "Statistical Analysis of the Dearth of Super-eccentric Jupiters in the Kepler Sample", AJ, **165**, 82

[20] Kanodia et al. incl. **Dong** 2022, "TOI-3757b: A Low-density Gas Giant Orbiting a Solar-metallicity M Dwarf", AJ, **164**, 81

[21] Stefansson et al. incl. **Dong** 2022, "The Warm Neptune GJ 3470b has a Polar Orbit", ApJ Letter, **931**, L15
[22] Foreman-Mackey et al. incl. **Dong** 2021, "exoplanet: Gradient-based Probabilistic Inference for Exoplanet Data & Other Astronomical Time Series", JOSS, **6**, 3285
[23] 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
[24] 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
[25] 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**