

Jiayin (DJ) Dong

Flatiron Research Fellow

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Positions

Assistant Professor (starting in Fall 2025)

Champaign, IL

Department of Astronomy, University of Illinois Urbana-Champaign

Flatiron Research Fellow

New York, NY

Center for Computational Astrophysics, Flatiron Institute – Simons Foundation

2022–25

Education

Pennsylvania State University

State College, PA

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

2022

M.S. in Astronomy & Astrophysics

2019

University of Illinois Urbana-Champaign

Champaign, IL

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

2017

Fellowships & Awards

2022–25	Flatiron Research Fellowship Postdoctoral fellowship at CCA, Flatiron Institute
2024	TD Lee Visiting Fellow Tsung-Dao Lee Institute Visiting Fellow in Astrophysics
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 have led 12 observing programs totaling over 40 nights on the WIYN 3.5m, CTIO 1.5m, MINERVA-A, and LCOGT telescopes.

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

2024A, #536482, Priority 3, **39 hours**

2023A, #954402, Priority 0, **17.8 hours (NASA WIYN Data Award, \$6,000)**

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**

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**
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**
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

July 2024 **TDLI Frontier of Astrophysics Forum** "Origins and Diversity of Giant Planets" Shanghai, China
 April 2024 **ET Science Seminar** "Origins of Close-in Giant Planets" (Virtual)
 Mar. 2024 **Carnegie Observatories Colloquium** "Origins and Diversity of Giant Planets" Pasadena, CA
 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

Conference Talks

May 2024 **50 years of Binaries and Disks: Lubow@75** "Isotropic Stellar Obliquity Distribution of Hot Jupiter Systems" Las Vegas, NV
 Mar. 2024 **Extreme Solar Systems V** (Plenary) "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

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– **Lucas Brefka**, Pennsylvania State University '27, "Dynamics and Composition of a Sub-Saturn World"
- 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 and postbac students

- 2024– **Tyler Fairnington**, University of Southern Queensland '25, "Eccentricity Distribution of TESS Planets", co-mentored with Prof. Chelsea Huang
- 2024 **Jasmine Freeman**, Valdosta State University '25, "Eccentricity Distribution of Planets around Metal rich vs poor stars" via the Simons-NSBP program
- 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

Thesis Reviewer

- 2024 **Nataliea Lowson**, PhD, University of Southern Queensland

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 **Let's Talk Science** Discussing exoplanet science with curious guests at Simons Foundation Presents Event "Imagining Other Worlds"
- 2024 **StarDate Magazine** Interviewed by the US magazine StarDate for an article about Hot Jupiters
- 2024 **Solar Viewing Volunteer** Delivering solar viewing sessions for parkgoers at Madison Square Park before and during 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 (x3), MNRAS(x1), A&A (x1), & PASP (x1)
- 2024 **Panelist** for NASA-related research programs
- 2023, 24 **External Panelist** served on CanTAC for the CFHT proposal (x2)
- 2023 **Panelist** for NASA-related research programs
- 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

- 2024 **“Colossal Planet in Rare Orbit Offers Clues to Origins of 'Hot Jupiters'”** Press release of the discovery of TIC-241249530b by the **NOIRLab; Simons Foundation; Penn State** (Gupta, Millholland, Im, **Dong**+24, Nature)
- 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

† denotes student papers supervised by me

1st-Author Publications

- [1] **Dong**, Chontos, Zhou, et al. 2024, "Origins of Super Jupiters: TOI-2145b Has a Moderately Eccentric and Nearly Aligned Orbit", AJ, in press
- [2] **Dong** & Foreman-Mackey 2023, "A Hierarchical Bayesian Framework for Inferring the Stellar Obliquity Distribution", AJ, **166**, 112
- [3] **Dong**, Wang, Rice, et al. 2023, "TOI-1859b: A 64-Day Warm Jupiter on an Eccentric and Misaligned Orbit", ApJ Letter, **951**, L29
- [4] **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
- [5] **Dong**, Jiang & Armitage 2021, "Boundary Layer Circumplanetary Accretion: How Fast Could an Unmagnetized Planet Spin Up Through Its Disk?", ApJ, **921**, 54
- [6] **Dong**, Huang, Zhou, Dawson, et al. 2021, "TOI-3362b: A Proto-Hot Jupiter Undergoing High-Eccentricity Tidal Migration", ApJ Letter, **920**, L16
- [7] **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
- [8] **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

- [9] Radzom†, **Dong**, Rice, et al. 2024, "Evidence for Primordial Alignment: Insights from Stellar Obliquity Measurements for Compact Sub-Saturn Systems", AJ, **168**, 116
- [10] 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

- [11] Stefansson et al. incl. **Dong** 2024, "Gaia-4b and 5b: Radial Velocity Confirmation of Gaia Astrometric Orbital Solutions Reveal a Massive Planet and a Brown Dwarf Orbiting Low-mass Stars", AJ, under review
- [12] Mikal-Evans et al. incl. **Dong** 2024, "Silicon monoxide in an ultrahot Jupiter atmosphere with a super-stellar C/O", Nature Astronomy, under review
- [13] Gupta et al. incl. **Dong** 2024, "The NEID Earth Twin Survey. I. Confirmation of a 31-day planet orbiting HD 86728", AJ, in press
- [14] Gupta, Millholland, Im, **Dong**, et al. 2024, "A hot Jupiter progenitor on a super-eccentric, retrograde orbit", Nature, **632**, 50
- [15] 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, **962**, 22
- [16] 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, **682**, 129
- [17] 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
- [18] 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
- [19] Gupta et al. incl. **Dong** 2023, "A High-Eccentricity Warm Jupiter Orbiting TOI-4127", AJ, **165**, 234

- [20] Heitzmann et al. incl. **Dong** 2023, "TOI-4562b: A Highly Eccentric Temperate Jupiter Analog Orbiting a Young Field Star", *Apl*, **165**, 121
- [21] Frazier et al. incl. **Dong** 2023, "NEID Reveals that The Young Warm Neptune TOI-2076 b Has a Low Obliquity", *Apl Letter*, **944**, 41
- [22] Bowens, Shannon, Dawson, **Dong** 2023, "Longterm Stability of Planetary Systems Formed from a Transitional Disk", *Apl*, **944**, 201
- [23] Jackson, Dawson, Quarles, **Dong** 2023, "Statistical Analysis of the Dearth of Super-eccentric Jupiters in the Kepler Sample", *AJ*, **165**, 82
- [24] Kanodia et al. incl. **Dong** 2022, "TOI-3757b: A Low-density Gas Giant Orbiting a Solar-metallicity M Dwarf", *AJ*, **164**, 81
- [25] Stefansson et al. incl. **Dong** 2022, "The Warm Neptune GJ 3470b has a Polar Orbit", *Apl Letter*, **931**, L15
- [26] Foreman-Mackey et al. incl. **Dong** 2021, "exoplanet: Gradient-based Probabilistic Inference for Exoplanet Data & Other Astronomical Time Series", *JOSS*, **6**, 3285
- [27] 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
- [28] Kanodia et al. incl. **Dong** 2020, "TOI-1728b: The Habitable-zone Planet Finder Confirms a Warm Super Neptune Orbiting an M Dwarf Host", *Apl*, **899**, 1
- [29] 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**