

# Jeremy L. Smallwood

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## Employment

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<b>Dodge Family Prize Fellowship in Astrophysics</b>	[2024 – Present]
University of Oklahoma, Norman, OK, USA	
<b>ASIAA Distinguished Postdoctoral Fellowship</b>	[2022 – 2024]
Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan	
<b>CASPER Postdoctoral Fellow</b>	[2021 – 2022]
Baylor University, Waco, Texas, USA	
<b>NCTS Prize Postdoctoral Fellowship</b>	[2021]
National Center for Theoretical Science Physics Division, Taiwan	

## Education

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<b>PhD in Astronomy</b>	[2017 – 2021]
University of Nevada, Las Vegas	
Supervised by Professor Rebecca Martin	
<b>MS in Astronomy</b>	[2015 – 2017]
University of Nevada, Las Vegas	
<b>BA Astrophysics</b>	[2010 – 2015]
Baylor University, Waco, Texas	

## Publications

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**Total Refereed: 28; 1st-authored: 20; Citations: 301; h-index: 9; i10-index: 9. Statistics from [ADS](#).**

### 1st-authored

20. The polar debris disc around 99 Herculis: A potential signpost for polar circumbinary planets  
**Smallwood J. L.**, DeRocco W., Qin Z., Sefilian A., 2025, MNRAS Letters, re-submitted
19. Polar alignment of a circumbinary disc around a brown dwarf binary  
**Smallwood J. L.**, Baycroft T. A., Triaud A. H. M. J., Nealon R. P., MNRAS, 542, L85, [ADS](#)
18. Shedding light on the origin of the broken misaligned circumtriple disk around GW Ori  
**Smallwood J. L.**, Lubow H. S., Martin R. G., ApJL, Accepted, [ADS](#)
17. Circumbinary accretion as a diagnostic for binary–disc misalignment  
**Smallwood J. L.**, Li Y-P., Deng H., Franchini A., MNRAS, Accepted, [ADS](#)
16. Observational Signatures of Dust Traffic Jams in Polar-aligning Circumbinary Disks  
**Smallwood J. L.**, Nealon R., Yen H-W., Pinte C., Longarini C., Aly H., Lin M-K., ApJL, 976, L23, [ADS](#)
15. Polar alignment of a dusty circumbinary disc – II. Application to 99 Herculis  
**Smallwood J. L.**, Lin M-K., Nealon R., Aly H., Longarini C., 2024, MNRAS, 534, 4018, [ADS](#)
14. Polar alignment of a dusty circumbinary disc – I. Dust ring formation  
**Smallwood J. L.**, Lin M-K., Aly H., Nealon R., Longarini C., 2024, MNRAS, 532, 1068, [ADS](#)
13. Formation of misaligned second-generation discs through flyby encounters  
**Smallwood J. L.**, Nealon R., Cuello N., Dong R., Booth R. A., 2024, MNRAS, 527, 2094, [ADS](#)

12. Formation of the warped debris disc around  $\beta$  Pictoris  
**Smallwood J. L.**, 2023, MNRAS, 523, 3526, [ADS](#)
11. Exciting spiral arms in protoplanetary discs from flybys  
**Smallwood J. L.**, Yang C-C., Zhu Z., Martin R. G., Dong R., Cuello N., Isella A., 2023, MNRAS, 521, 3500, [ADS](#)
10. Formation of polar circumstellar discs in binary star systems  
**Smallwood J. L.**, Martin R. G., Lubow H. S., 2023 MNRAS, 520, 2952, [ADS](#)
9. Accretion onto a binary from a polar circumbinary disc  
**Smallwood J. L.**, Lubow H. S., Martin R. G., 2022, MNRAS, 514, 1249, [ADS](#)
8. GW Ori: circumtriple rings and planets  
**Smallwood J. L.**, Nealon R., Chen C., Martin R. G., Bi J., Dong R., Pinte C., 2021, MNRAS, 508, 392, [ADS](#)
7. On the role of resonances in polluting white dwarfs by asteroids  
**Smallwood J. L.**, Martin R. G., Livio M., Veras D., 2021, MNRAS, 504, 3375, [ADS](#)
6. Sustained Kozai-Lidov oscillations in misaligned circumstellar gas discs  
**Smallwood J. L.**, Martin R. G., Lubow H. S., 2021, ApJ, 907, L14, [ADS](#)
5. Formation of the polar debris disc around 99 Herculis  
**Smallwood J. L.**, Franchini A., Chen C., Becerril E., Lubow S. H., Yang C-C., Martin R. G., MNRAS, 2020, MNRAS, 494, 487, [ADS](#)
4. Alignment of a circumbinary disc around an eccentric binary with application to KH 15D  
**Smallwood J. L.**, Lubow S. H., Franchini A., Martin R. G., 2019, MNRAS, 486, 2919, [ADS](#)
3. Investigation of the asteroid collision model for the repeating fast radio bursts  
**Smallwood J. L.**, Martin R. G., Zhang B., 2019, MNRAS, 485, 1367, [ADS](#)
2. White dwarf pollution by asteroids from secular resonances  
**Smallwood J. L.**, Martin R. G., Livio M., Lubow S. H., 2018, MNRAS, 480, 57, [ADS](#)
1. Asteroid impacts on terrestrial planets: The effects of super-Earths and the role of the  $\nu_6$  resonance  
**Smallwood J. L.**, Martin R. G., Lepp S., Livio M., 2018, MNRAS, 473, 295, [ADS](#)

#### **Student-led publications (as supervisor)**

3. Fast radio bursts from asteroid-neutron star collisions triggered by the von Zeipel-Lidov-Kozai instability  
Qin Z., **Smallwood J. L.**, Liu S., Gao Y., 2025, ApJ, submitted
2. Evolution of dust in a protoplanetary disc driven by stellar flybys: implications for the streaming instability  
Su W-S., **Smallwood J. L.**, Lin M-K., Yang C-C., Cuello N., 2025, MNRAS, submitted
1. Misaligned circumbinary discs around unequal-mass eccentric binaries: alignment, morphology, and binary accretion variability  
Yang R., **Smallwood J. L.**, Deng H., Li Y., Franchini A., Dong R., Liu S., 2025, MNRAS, submitted

#### **Co-authored**

5. Disc-planet misalignment from an unstable triple system: IRAS04125  
Nealon R., **Smallwood J. L.**, Aly H., Winter A. J., Longarini C., Cuello N., Veras D., Alexander R., 2025, MNRAS, 540, L84, [ADS](#)
4. Polar alignment of a massive retrograde circumbinary disc around an eccentric binary  
Abod C., Chen C., **Smallwood J. L.** et al., 2022, MNRAS, 517, 732, [ADS](#)
3. GW Ori: interactions between a triple-star system and its circumtriple disk in action  
Bi J., van der Marel N., Dong R., Muto T., Martin R. G., **Smallwood J. L.** et al., 2020, ApJ, 895, L18, [ADS](#)

2. Asteroid belt survival through stellar evolution: dependence on the stellar mass  
Martin R. G., Livio M., **Smallwood J. L.**, Chen C., 2020, MNRAS, 494, L17, [ADS](#)
1. Late delivery of nitrogen to Earth  
Chen C., **Smallwood J. L.**, Martin R. G., Livio M., 2019, AJ, 157, 80, [ADS](#)

## Awards and Grants

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Dodge Family Price Fellowship in Astrophysics	[2024-present]
Poster Award at "Postdoc Research & Scholarly Activity Day", University of Oklahoma	[2025]
Poster Award at "DISC Inaugural Data Science Symposium", University of Oklahoma	[2025]
DISC Postdoctoral Fellowship, University of Oklahoma	[2024-2025]
Taiwan Outstanding Postdoctoral Fellowship Award	[2023]
Academia Sinica Travel Grant	[2023]
UNLV Outstanding STEM Dissertation Award	[2022]
UNLV Research Assistant Fellowship	[2021]
UNLV Graduate Assistant Fellowship	[2016 – 2021]
UNLV Golden Medallion Award	[2021]
UNLV Summer Research Scholarship	[2020]
UNLV Graduate Showcase Award	[2020]
Wolzinger Family Science Research Fellowship	[2019-2020]
NASA Nevada Space Grant Consortium Fellowship	[2017 – 2018]
UNLV Outstanding STEM Thesis Award	[2018]
Baylor University NSF Summer Research Fellowship	[2014]

## Teaching Experience

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Instructor for ASTR 1523 (Life in the Universe), OU	[2025]
Astronomy Lab Instructor, UNLV	[2016 – 2021]
Guest Lecturer of Introductory Astronomy: the Solar System, UNLV	[2017]
Teaching Assistant for Astronomy Laboratory, Baylor Uni.	[2015]
Teaching Assistant for Physics of Sound and Acoustics Laboratory, Baylor Uni.	[2015]
Teaching Assistant for Partial Differential Equations, Baylor Uni.	[2014]
Supplemental Instructor in Chemistry, Baylor Uni.	[2012 – 2013]

## Academic Service

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Peer review referee for <i>ApJ</i> , <i>MNRAS</i> , <i>Nature Astronomy</i> , <i>PSJ</i> , and <i>A&amp;A</i>	[2019 – Present]
Session chair for Architectures 2 at Exoplanets IV	[2022]

## Mentorship and Departmental Activities

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Mentoring a PhD student at the University of Oklahoma	[2025 – Present]
• Teddy Welsh – "Circumbinary planet-disc interactions"	
Mentoring a student through the University of Oklahoma REU program	[2025 – Present]
• Sheina Peralta – "Polar alignment of dusty circumbinary discs around equal mass binaries"	
Mentoring an undergraduate student at University of Oklahoma	[2025 – Present]
• Michael Munnelly – "Stellar flybys around circumbinary discs"	
Mentoring three students from the "Summer School for Planet Formation and Protoplanetary Disks"	[2024 – Present]

(China Center of Advanced Science and Technology)

- Ruiqi Yang – "Circumbinary accretion onto unequal mass binary star systems"
- Ho Wan Cheng – "The growth of inclined planetary systems"
- Zhizhen Qin – "Fast radio bursts from asteriod-Neutron star collisions from the KL instability"

Mentoring a student from the ASIAA Summer Student Program [2023 – Present]  
• Wei-Shan Su – "The evolution of dusty spiral arms excited from flybys"

Mentored an undergraduate student in research (planet habitability) and classes, UNLV [2019–2021]  
Organizer of the UNLV Astro Coffee and Journal Club, UNLV [2017–2018]

## Professional Development and Summer Schools

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Research Collaboration with Dr. Ruobing Dong [2023]  
University of Victoria, Victoria, Canada  
– Visited Dr. Dong to increase my capabilities of producing synthetic observations

Research Collaboration with Dr. Daniel Price [2019]  
Monash University, Melbourne, Australia  
– Visited Dr. Price to increase my capabilities of hydrodynamical simulations.

Tsung-Dao Lee Institute (TDLI) Summer School in Computational Astrophysics [2017]  
Minhang Campus of Shanghai Jiao Tong University in Shanghai, China  
– Summer school on astrophysical fluid dynamics lectured by Dr. Daniel Price.

## Technical Skills: Computer Modeling and Programming

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**Programming Languages:** Python, Julia, MATLAB, Mathematica, Fortran, C++, Shell Script, HTML

**Simulation Techniques:** Smoothed Particle Hydrodynamics (SPH), N-body Simulations

**Documentation and Typesetting:** LaTeX

**Modeling and Analysis Tools:** MATLAB, Mathematica

**Scripting and Automation:** Shell Scripting for data processing and workflow automation

## Talks

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### Invited Talks

Astronomy Seminar, Yale University [2025]  
Physics Colloquium, Baylor University [2025]  
The formation and long-term evolution of circumbinary planetary systems across the H-R diagram [2025]  
Astronomy Colloquium, University of Geneva [2025]  
Physics & Astronomy Colloquium, University of Georgia [2024]  
Lunch talk, University of Oklahoma [2024]  
Astronomy Colloquium, National Taiwan Normal University [2024]  
Astronomy Colloquium, Academia Sinica, Institute of Astronomy and Astrophysics [2024]  
Astronomy Colloquium, Tsinghua University [2024]  
50 years of Binaries and Disks: Lubow@75, University of Nevada, Las Vegas [2024]  
Simulating Physics in Celestial Ecosystem (SPICE): Star, Disk, and Planet Formation, Sendai, Japan [2024]  
Joint Franco-Australian 5th Phantom+MCFOST Users Workshop 2024, Monash University [2024]  
Astronomy Colloquium, Southern University of Science and Technology [2023]  
Astronomy Colloquium, Shanghai Astronomical Observatory [2023]

Astronomy Colloquium, Chiense University of Hong Kong	[2023]
Astronomy Colloquium, Hong Kong University Laboratory of Space Research	[2023]
Astronomy Colloquium, University of Oklahoma	[2023]
Physics & Astronomy Colloquium, University of Alabama	[2023]
Astronomy Colloquium, University of Nevada, Las Vegas	[2023]
Astronomy Colloquium, National Central University	[2023]
Astronomy Colloquium, Dominion Astrophysical Observatory	[2023]
Astronomy Colloquium, National Taiwan Normal University	[2023]
Coffee talk, University of Cambridge	[2022]
Astronomy Colloquium, University of Warwick	[2022]
Astronomy Colloquium, University of St. Andrews	[2022]
Astronomy Colloquium, University of Edinburgh	[2022]
Astronomy Colloquium, Academia Sinica, Institute of Astronomy and Astrophysics	[2021]
Astronomy Colloquium, University of Texas, San Antonio	[2021]
Astronomy Colloquium, University of Florida	[2021]
Astronomy Colloquium, Rice University	[2021]
Astronomy Colloquium, Baylor University	[2021]
Astronomy Colloquium, University of Southern Queensland	[2019]
Astronomy Colloquium, University of New South Wales	[2019]
Astronomy Colloquium, Australian National Institute for Theoretical Astrophysics	[2019]
Homecoming Physics Talk, Baylor University	[2018]

### **Contributed Talks**

Multiplicity in Young Stars	[2025]
Rogue Worlds 2024: Uniting Theory and Observation	[2024]
EAS 2024: Stars, discs & planets: dynamics & evolution in multiple systems	[2024]
Exoplanets & Planet Formation Workshop, Yanqing, Beijing, China	[2023]
Asia Oceania Geosciences Society 20 <sup>th</sup> Annual Meeting	[2023]
European Astronomical Society Annual Meeting	[2023]
The inner disk of young stars: accretion, ejection, and planet formation, Corsica, France	[2023]
Protostar and Planets VII	[2023]
East-Asian ALMA Science Workshop 2023	[2023]
Taiwanese Theoretical Astrophysics Workshop II	[2022]
Planet and binary formation in gravitationally unstable protoplanetary discs in the high-resolution era	[2022]
NCTS-ASIAA Workshop: Stars, Planets, and Formosa	[2022]
European Astronomical Society Annual Meeting	[2022]
Exoplanets IV, Las Vegas, Nevada	[2022]
Lunar and Planetary Science Conference	[2022]
NCTS Annual Theory Meeting	[2021]
SPF2: Star and Planet Formation in the Southwest, Biosphere 2, Oracle, Arizona	[2018]
UNLV Journal Club Talk, University of Nevada, Las Vegas	[2017]
Lunar and Planetary Conference	[2015]
Undergraduate Research Symposium, Baylor University	[2014]
Texas Astronomy Undergraduate Research Symposium, University of Texas, Austin	[2014]

### **Press Releases**

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"This May Be the First Planet Found Orbiting 3 Stars at Once", <a href="#">The New York Times</a>	[2021]
"This May Be The First Planet Ever Found Orbiting Three Stars At Once", <a href="#">IFL Science</a>	[2021]
"UNLV grad's team may have found first planet orbiting 3 stars", <a href="#">Las Vegas Review Journal</a>	[2021]
"Exoplanet in a triple star system may orbit all three at once", <a href="#">New Scientist</a>	[2021]

- "UNLV astronomers discover planet appearing to orbit three stars", [Fox 5 News](#) [2021]
- "The first planet to orbit three stars", [Italian National Institute of Astrophysics Journal](#) [2021]
- "Super-Earths draw asteroids to other worlds, which may seed life", [New Scientist](#) [2017]