

# JARED ROBERT RICE

E-mail: [jared.r.rice@protonmail.com](mailto:jared.r.rice@protonmail.com)

Homepage: [jaredrice.space](http://jaredrice.space)

ORCID ID: [0000-0003-3887-091X](https://orcid.org/0000-0003-3887-091X)

Postdoctoral Research Associate, Texas State University

## Education

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PhD, Astronomy, 2018

University of Nevada, Las Vegas

Advisor: [Bing Zhang, PhD](#)

Dissertation: *Primordial black holes in the cosmological context and transient electromagnetic signatures from merging black hole binaries*

MS, Physics, 2012

Montana State University

Advisors: *Sachiko Tsuruta, PhD and Jiong Qiu, PhD*

BS, Astrophysics, 2008

University of California, Santa Cruz

Advisor: *Joel Primack, PhD*

## Research interests

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Electromagnetic counterparts of binary compact object mergers

- EM radiation mechanisms, relativistic blast waves, evolving synchrotron spectra, interaction of EM fields with gravitational waves, predicting observational EM and GW signatures of compact object mergers

X-ray and optical observations of high-energy astrophysical sources:

- X-ray binaries in interacting and starforming galaxies, X-ray (*Chandra*) and optical (*HST*) data analysis

Gamma-ray bursts:

- Multiwavelength GRB blast wave afterglows, prompt emission, NS equation of state, gravitational wave emission

Very long baseline interferometry of supermassive black hole jet cores

- Probing black hole environments using the frequency-dependent synchrotron radio emission, astrometry of jet cores with the Very Long Baseline Array

Primordial black holes

- Accretion and evaporation histories of PBHs, PBHs as cosmic messengers, feasibility of detection

## Publications

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**Metrics:** Published papers: 12; Total citations: 87; h-index: 5; First author h-index: 2

[ADS entries](#), [ADS citation metrics](#)

1. Yang, X., Lü, H.-J., Yuan, H.-Y., **Rice, J.**, Zhang, Z., Zhang, B.-B., and Liang, E.-W., *Evidence for gravitational lensing of GRB 200716C*, [The Astrophysical Journal Letters](#), (accepted 2021)
2. **Rice, J.R.**, Rangelov, B., Prestwich, A., Chandar, R., Bichon, L., and Boldt, C., *X-ray binaries in M51 I: catalog and statistics*, [The Astrophysical Journal](#), (accepted 2021)
3. **Rice, J.R.** and Zhang, B., *Growth of stellar mass black holes in dense molecular clouds and GW190521*, [The Astrophysical Journal](#), **908**, 59 (2021)
4. **Rice, J.R.**, Rangelov, B., Prestwich, A., Chandar, R., Bichon, L., and Boldt, C., *X-ray binaries in M51 II: individual sources*, (ApJ, submitting soon, 2021)
5. **Rice, J.R.**, Rangelov, B., Chandar, R., and Prestwich, A., *Optical counterparts to X-ray sources in nearby starburst galaxies*, (ApJ, submitting soon, 2021)

6. **Rice, J.R.** and Zhang, B., *Transient electromagnetic signatures from merging supermassive black hole binaries*, (in progress, 2021)
7. **Rice, J.R.**, Zavala, R.T., and Taylor, G.B., *Core shifts in compact symmetric objects*, (in progress, 2021)
8. Lan, L., Lü, H.-J., Shen, J., **Rice, J.**, Li, L., and Liang, E.-W., *The properties of prompt emission in short GRBs with extended emission observed by Fermi/GBM*, [Monthly Notices of the Royal Astronomical Society](#), **492**, 3622 (2020)
9. Lan, L.; Lü, H.-J.; **Rice, J.**; and Liang, E.-W., *Constraining the nuclear equation of state via gravitational-wave radiation of short gamma-ray burst remnants*, [The Astrophysical Journal](#), **890**, 99 (2020)
10. Moravec, E. et al., *The early career perspective on the coming decade, astrophysics career paths, and the Decadal Survey process*, APC White Papers No. 8, [Bulletin of the American Astronomical Society](#), **51**, 8 (2019)
11. Lü, H.-J., Shen, J.; Lan, L., **Rice, J.**, Lei, W.-H., Liang, E.-W. *Diagnosing the remnants of binary neutron star merger from GW170817/GRB170817A event*, [Monthly Notices of the Royal Astronomical Society](#), **486**, 4479 (2019)
12. **Rice, J.R.**, *Primordial black holes in the cosmological context and transient electromagnetic signatures from merging black hole binaries*, [ProQuest Dissertations and Theses](#) (2018)
13. Lan, L., Lü, H.-J., Zhong, S.-Q., Zhang, H.-M., **Rice, J.**, Cheng, J.-G., Du, S.-S., Li, L., Lu, R.-J., and Liang, E.-W., *Characteristics of two-episode emission patterns in Fermi long gamma-ray bursts*, [The Astrophysical Journal](#), **862**, 155 (2018)
14. **Rice, J.R.** and Zhang, B., *Cosmological evolution of primordial black holes*, [Journal of High Energy Astrophysics](#), **13**, 22 (2017)
15. Lü, H.-J., Zhang, H.-M., Zhong, S.-Q., Hou, S.-J., Sun, H., **Rice, J.**, and Liang, E.-W., *Magnetar central engine and possible gravitational wave emission of nearby short GRB 160821B* [The Astrophysical Journal](#), **835**, 181 (2017)
16. Li, L.B., Zhang, Z.B., and **Rice, J.**, *Radio afterglow rebrightening: evidence for multiple active phases in gamma-ray burst central engines*, [Astrophysics and Space Science](#), **359**, 37 (2015)

#### Professional duties

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- Panel Leveler for the first ever Dual Anonymous Peer Review (DAPR) *Chandra* Cycle 23 Proposal Review, June 21–24, 2021, [Chandra X-ray Observatory](#)
- Referee, 2021 – present, [Journal of Cosmology and Astroparticle Physics](#)
- Referee, 2019 – present, [Journal of High Energy Astrophysics](#)

#### Textbook editing and illustrations

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- Copyedited and produced numerous figures for Bing Zhang, *The Physics of Gamma-Ray Bursts*, [Cambridge University Press](#) (2018)
- Produced various diagrams for Thomas Banks, *Modern Quantum Field Theory: A Concise Introduction*, [Cambridge University Press](#) (2008)

#### Awards

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|---|--------|-----------|
| • US Naval Observatory Flagstaff Station Colloquium Honorarium    | (2018) | \$ 250    |
| • Nevada NASA Space Grant Consortium Graduate Research Fellowship | (2016) | \$ 21,000 |
| • UNLV Foundation Bigelow Travel Grant                            | (2014) | \$ 4,000  |
| • MSU Outstanding Graduate Teaching Assistant Award               | (2012) | —         |
| • NSF REU Research Grant  | (2007) | \$ 5,000  |

- UCSC Crown College Undergraduate Research Fellowship (2007) \$ 700

## Skills

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- General: [Python](#)/[iPython](#), [SAOImageDS9](#), [L<sup>A</sup>T<sub>E</sub>X](#), [IDL](#), [HTML](#)
- X-ray data analysis: [Chandra Interactive Analysis of Observations \(CIAO\)](#)
- Optical data analysis: [Image Reduction and Analysis Facility \(IRAF\)](#)
- Radio data reduction: [Astronomical Image Processing System \(AIPS\)](#)
- Gravitational wave data analysis: [GWpy](#) and [PyCBC](#)

## Teaching

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- Graduate Teaching Assistant (2013 – 2018), UNLV
- Adjunct Instructor of Physics (2012/2013), Miami University, Oxford, OH
- Adjunct Instructor of Physics (2013), Miami University Hamilton, Hamilton, OH
- Graduate Teaching Assistant (2009 – 2012), MSU
- Guest lecturer, Solar System Astronomy (Fall 2011), MSU

## Conferences & Workshops

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- [Yukawa Institute of Theoretical Physics International Molecule-type Workshop: Fast Radio Bursts: A Mystery Being Solved?](#), February 8–19, 2021
- [ALMA Community Day Event](#), The University of Texas at Austin, Austin, TX, April 8, 2019
- [Early Career Astronomer and Astrophysicist Focus Session for the 2020 Decadal Survey](#), Washington, DC, October 8–9, 2018
- [16th Synthesis Imaging Workshop](#), New Mexico Tech, Socorro, NM, May 16–23, 2018
- [LIGO Open Data Workshop # 1](#), Caltech, Pasadena, CA, March 25–27, 2018
- [IAU 338: GW Astrophysics: Early Results from GW Searches and EM Counterparts](#), 2017
  - Contributed talk: “*Radio afterglow of gravitation-driven plasma waves in SMBH binary mergers*”
- [Eighth Huntsville Gamma-Ray Burst Symposium](#), 2016
  - Poster: “*Cosmological evolution of primordial black holes*”
- UNLV/Caltech Radio Transient Workshop, Las Vegas, April 11–12, 2016
- UNLV GRBs and Numerical Simulations Workshop, Las Vegas, September 9, 2015
- [European Week of Astronomy and Space Science](#), Geneva, Switzerland, 2014
- [IAU 307: New Windows on Massive Stars](#), Geneva, Switzerland, 2014
- UCSC Galaxy Formation and Evolution Workshop, Santa Cruz, August 6–10, 2007
- All-Wavelength Extended Groth Strip International Survey Meeting, Santa Cruz, December, 2006

## Outreach

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- Astronomy Day Volunteer (2010 – 2012), Museum of the Rockies, Bozeman, MT
- Instructor, Rocket Physics (2011), *MSU Peaks & Potentials* (elementary students)

## Professional references

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1. Blagoy Rangelov, PhD, Assistant Professor of Astrophysics, Texas State University  
E-mail: [rangelov@txstate.edu](mailto:rangelov@txstate.edu)  
Phone: +1 512/245-8373  
Website: <http://www.blagoyrangelov.com>

2. Bing Zhang, PhD, Distinguished Professor of Astrophysics, UNLV  
E-mail: [zhang@physics.unlv.edu](mailto:zhang@physics.unlv.edu)  
Phone: +1 702/895-4050  
Website: <http://www.physics.unlv.edu/~bzhang/>
3. Darrell Pepper, PhD, Professor of Mechanical Engineering, UNLV  
E-mail: [darrell.pepper@unlv.edu](mailto:darrell.pepper@unlv.edu)  
Phone: +1 702/895-1056  
Website: <https://www.unlv.edu/people/darrell-pepper>
4. Robert Zavala, PhD, Astronomer, United States Naval Observatory, Flagstaff Station  
E-mail: [bzavala@nofs.navy.mil](mailto:bzavala@nofs.navy.mil)  
Phone: +1 928/779-5132 (260)  
Website: <https://www.usno.navy.mil/USNO>

