

Reshma Anna-Thomas

Curriculum vitae

Department of Physics and Astronomy,
West Virginia University,
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Research interests Fast radio transients; radio frequency observations; time and imaging domain searches; polarization properties; Fourier and time domain periodicity searches; deep imaging of interferometric data

Education

2019 – 2024 **Ph.D. in Physics**, West Virginia University, United States of America

Supervisor Dr. Sarah Burke-Spolaor

Thesis *Searching, localizing, and characterizing fast radio transients*

2019 – 2021 **Master of Science in Physics**, West Virginia University, United States of America, CGPA: 3.83/4

2014 – 2019 **Integrated Masters in Physics**, Pondicherry University, India, CGPA: 9.4/10

Supervisor Dr. K.V.P. Latha

Thesis *Polarimetry using Carbon Nanotube based radiation detector*

Awards/Scholarships

2019 **Dr. V. Devarajan Memorial Gold medal**, Pondicherry University

2017 – 2019 **Postgraduate Merit Scholarship**, Pondicherry University

2014 – 2017 **Merit Scholarship**, Pondicherry University

Research Experiences

2018 **Summer intern**, Indian Institute of Astrophysics, Bangalore

Supervisor Prof. S. P. Rajaguru

Title Spectral line synthesis for 3D Magneto-Hydro Dynamic simulation and effect of magnetic field on line width and asymmetries.

2016 **Summer intern**, Indian Academy of Sciences Summer Research Fellow

Supervisor Prof. V. Murugesan, *Indian Institute of Science, Bangalore*
Title Introduction to Numerical Solutions of Partial Differential Equations.

Workshops & Training

- 2023 ALMA Data Reduction Workshop, *West Virginia University*
- 2023 NRAO Synthesis imaging workshop, *Charlottesville*
- 2021 Summer School in Statistics for Astronomers, *Pennsylvania State University*
- 2020 Arecibo Single Dish Workshop, *Arecibo Observatory*
- 2020 The Green Bank Telescope observer's training, *Green Bank Observatory*
- 2018 Summer school on astronomy and astrophysics, *Kodaikanal Solar Observatory*

Professional Experience

- 2022-now **Organizer**, *Weekly FRB journal club*, West Virginia University
- 2023 **Mentor**, *Summer Undergraduate Research Experience program*, Project Title: "Searching for Fast Radio Transients Using The Petabyte Project".
- 2023 **Mentor**, *Summer Undergraduate Research Experience program*, Project Title: "Imaging and Localization of FRBs Using the Realfast Database."

Selected Talks & Posters

Online participation are marked with a †

- 2024 **Invited Talk**, *Magnetic field reversals in a turbulent environment around a repeating fast radio burst*, University of Melbourne
- 2024 **Invited Talk**, *Searching, localizing and characterizing fast radio transients*, CRAFT meeting, Swinburne University of Technology
- 2023 **Poster+Lightning talk**[†], *Realfast: Past, Present, and Future*, Fast Radio Bursts 2023 Conference
- 2023 **Poster**[†], *Current status of The Petabyte Project*, Fast Radio Bursts 2023 Conference
- 2023 **Invited Talk**, *Fast Radio Bursts: Since 2007*, Physics of Neutron stars meeting, Joint Space-Science Institute, University of Maryland, College Park

- 2023 **Invited Talk**[†], *Magnetic field reversals in a turbulent environment around a repeating fast radio burst*, Green Bank Observatories Community Webinar
- 2023 **Invited Talk**[†], *Magnetic field switching in a turbulent fast radio burst environment*, Carnegie Observatories
- 2022 **Invited Talk**, *Magnetic field switching in a turbulent fast radio burst environment*, NASA Goddard Space Flight Center
- 2022 **Invited Talk**, *Magnetic field switching in a turbulent fast radio burst environment*, George Washington University
- 2022 **Invited Talk**, *Magnetic field switching in a turbulent fast radio burst environment*, US Naval Research Laboratory
- 2022 **Contributed Talk**[†], *A highly variable magnetized environment in an FRB Source*, International Astronomical Union General Assembly/Fast Radio Bursts 2022
- 2022 **Invited Talk**, *A highly variable magnetized environment in an FRB Source*, Caltech, DSA lunch talk
- 2022 **Contributed Talk**, *A highly variable magnetized environment in an FRB Source*, American Astronomical Society 240 meeting
- 2022 **Invited Talk**[†], *A highly variable magnetized environment in an FRB Source*, ASIAA weekly meeting, Taiwan
- 2021 **Contributed Talk**[†], *Polarization studies of FRB 190520*, Fast Radio Bursts 2021 conference
- 2021 **Contributed Talk**[†], *On the nature of an unidentified Fermi source*, American Astronomical Society 237 meeting
- 2021 **Contributed Talk**[†], *On the nature of an unidentified Fermi source*, North American Nanohertz Observatory for Gravitational Waves (NANOGrav) Fall meeting

Academic Visits

- 2024 **Swinburne Institute of Technology**, *Host: Prof. Ryan M. Shannon*
- 2022 **Cahill Institute of Astronomy and Astrophysics, California Institute of Technology**, *Host: Dr. Casey J. Law*

Teaching

- 2022 **Guest Lecture**, *ASTR 700: Radio Astronomy*, West Virginia University
- 2020 **Teaching Assistant**, *PHYS111*, General Physics Lab, West Virginia University
- 2019 **Teaching Assistant**, *PHYS101*, General Physics Lab, West Virginia University

Outreach activities

Keynote Speaker at Young Innovators Program, *Government of Kerala*, India

Volunteer for hands-on science demonstration on Science Day at Spark Science Center, *Morgantown, WV*

Volunteer for hands-on science demonstration on SciTech Day at Carnegie Science Center, *Pittsburgh, PA*

Observing proposals

GBT **Observation of an FRB skewering the M31 halo**, *10.5 hours*, PI
24A-415

GBT **Regular monitoring of FRB 20190520B RM variations**, *43 hours*, PI
23A-365

GBT **Follow-up observation of a novel repeating FRB detected by CHIME**, *6 hours*, PI
22B-309

GBT **Polarimetry of Bursts from A Bright, Repeating FRB**, *7 hours*, PI
21B-347

GBT **Realfast RRAT or MSP? — 4FGL J1818.6-1533**, *12 hours*, PI
20B-407

VLA **Characterizing and Quantifying Persistent Radio Sources Around FRBs**, *8.6 hours*, Co-PI
22A-313

GBT **Polarimetry of Bursts from A Bright, Repeating FRB**, *5 hours*, Co-PI
21A-417

GBT **Realfast RRAT or MSP? — 4FGL J1818.6-1533**, *4.5 hours*, Co-PI
20A-420

Technical Strengths

	Level	Skill	Comment
Language:	■■■■■	Python	<i>Extensive data analysis and visualisation experience</i>
	■■■■■	C++, Fortran	<i>Basic understanding</i>
	■■■■■	L ^A T _E X	<i>Expert</i>
OS:	■■■■■	Unix	<i>Extensive experience</i>
Methods	■■■■■	SLURM, Git, Bash	<i>Extensive</i>

Languages

- Malayalam Native
- English, Tamil & Hindi Fluent

References

- Dr. Sarah Burke-Spolaor
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West Virginia University
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- Prof. Maura McLaughlin
Department of Physics and
Astronomy
West Virginia University
✉ mclaughlin.maura@gmail.com
- Dr. Casey J. Law
Cahill Center for Astronomy and
Astrophysics
California Institute of Technology
✉ caseyjlw@gmail.com

Publications

11. Zhen Yan , Wenfei Yu , K.L. Page , Jie Lin, Di Li, Chenhui Niu, Casey Law, Bing Zhang , Shami Chatterjee, Xian Zhang , and **Reshma Anna-Thomas**. “Simultaneous multi-wavelength observations of the repeating fast radio burst FRB 20190520B with Swift and FAST”. In *arXiv e-prints*, arXiv:2402.12084 (Feb. 2024), arXiv:2402.12084. doi:10.48550/arXiv.2402.12084. arXiv:2402.12084[astro-ph.HE]
10. **Reshma Anna-Thomas**, Sarah Burke-Spolaor, Casey J. Law, F. K. Schinzel, Kshitij Aggarwal, Geoffrey C. Bower, Liam Connor, and Paul B. Demorest. “An unidentified Fermi source emitting radio bursts in the Galactic bulge.” In: *arXiv e-prints*, arXiv:2401.02498 (Jan. 2024), arXiv:2401.02498. doi: 10.48550/arXiv.2401.02498.arXiv:2401.02498 [astro-ph.HE]
9. Xian Zhang, Wenfei Yu, Casey Law, Di Li, Shami Chatterjee, Paul Demorest, Zhen Yan, Chenhui Niu, Kshitij Aggarwal, **Reshma Anna-Thomas**, Sarah Burke-Spolaor, Liam Connor, Chao-Wei Tsai, Weiwei Zhu, and Gan Luo. “Temporal and Spectral Properties of the Persistent Radio Source Associated with FRB 20190520B with the VLA”. In: *The Astrophysical Journal* 959.2, 89 (Dec. 2023), p. 89. doi: 10.3847/1538-4357/ad0545. arXiv: 2307.16355 [astro-ph.HE].
8. **Reshma Anna-Thomas**, Liam Connor, Shi Dai, Yi Feng, Sarah Burke-Spolaor, Paz Beniamini, Yuan-Pei Yang, Yong-Kun Zhang, Kshitij Aggarwal, Casey J. Law, Di Li, Chenhui Niu, Shami Chatterjee, Marilyn Cruces, Ran Duan, Miroslav D. Filipovic, George Hobbs, Ryan S. Lynch, Chenchen Miao, Jiarui Niu, Stella K. Ocker, Chao-Wei Tsai, Pei Wang, Mengyao Xue, Ju-Mei Yao, Wenfei Yu, Bing Zhang, Lei Zhang, Shiqiang Zhu, and Weiwei Zhu. “Magnetic field reversal in the turbulent environment around a repeating fast radio burst”. In: *Science* 380.6645 (May 2023), pp. 599–603. doi: 10.1126/science.abo6526. arXiv: 2202.11112 [astro-ph.HE]
7. Stella Koch Ocker, James M. Cordes, Shami Chatterjee, Di Li, Chen-Hui Niu, James W. McKee, Casey J. Law, and **Reshma Anna-Thomas**. “Scattering variability detected from the circumsource medium of FRB 20190520B”. In: *Monthly Notices of the Royal Astronomical Society* 519.1 (Feb. 2023), pp. 821–830. doi: 10.1093/mnras/stac3547. arXiv: 2210.01975 [astro-ph.HE].
6. C. -H. Niu, K. Aggarwal, D. Li, X. Zhang, S. Chatterjee, C. -W. Tsai, W. Yu, C. J. Law, S. Burke-Spolaor, J. M. Cordes, Y. -K. Zhang, S. K. Ocker, J. -M. Yao, P. Wang, Y. Feng, Y. Niino, C. Bochenek, M. Cruces, L. Connor, J. -A. Jiang, S. Dai, R. Luo, G. -D. Li, C. -C. Miao, J. -R. Niu, **R. Anna-Thomas**, J. Sydnor, D. Stern, W. -Y. Wang, M. Yuan, Y. -L. Yue, D. -J. Zhou, Z. Yan, W. -W. Zhu, and B. Zhang. “A repeating fast radio burst associated with a persistent radio source”. In: *Nature* 606.7916 (June 2022), pp. 873–877. doi: 10.1038/s41586-022-04755-5. arXiv: 2110.07418 [astro-ph.HE].
5. Stella Koch Ocker, James M. Cordes, Shami Chatterjee, Chen-Hui Niu, Di Li, James W. McKee, Casey J. Law, Chao-Wei Tsai, **Reshma Anna-Thomas**, Ju- Mei Yao,

- and Marilyn Cruces. “The Large Dispersion and Scattering of FRB 20190520B Are Dominated by the Host Galaxy”. In: *The Astrophysical Journal* 931.2, 87 (June 2022), p. 87. doi: 10.3847/1538-4357/ac6504. arXiv: 2202.13458 [astro-ph.HE].
4. F. Kirsten, B. Marcote, K. Nimmo, J. W. T. Hessels, M. Bhardwaj, S. P. Tendulkar, A. Keimpema, J. Yang, M. P. Snelders, P. Scholz, A. B. Pearlman, C. J. Law, W. M. Peters, M. Giroletti, Z. Paragi, C. Bassa, D. M. Hewitt, U. Bach, V. Bezrukovs, M. Burgay, S. T. Buttaccio, J. E. Conway, A. Corongiu, R. Feiler, O. Forssén, M. P. Gawroński, R. Karuppusamy, M. A. Kharinov, M. Lindqvist, G. Maccaferri, A. Melnikov, O. S. Ould-Boukattine, A. Possenti, G. Surcis, N. Wang, J. Yuan, K. Aggarwal, **R. Anna-Thomas**, G. C. Bower, R. Blaauw, S. Burke-Spolaor, T. Cassanelli, T. E. Clarke, E. Fonseca, B. M. Gaensler, A. Gopinath, V. M. Kaspi, N. Kassim, T. J. W. Lazio, C. Leung, D. Z. Li, H. H. Lin, K. W. Masui, R. Mckinven, D. Michilli, A. G. Mikhailov, C. Ng, A. Orbidans, U. L. Pen, E. Petroff, M. Rahman, S. M. Ransom, K. Shin, K. M. Smith, I. H. Stairs, and W. Vlemmings. “A repeating fast radio burst source in a globular cluster”. In: *Nature* 602.7898 (Feb. 2022), pp. 585–589. doi: 10.1038/s41586-021-04354-w. arXiv: 2105.11445 [astro-ph.HE].
 3. Kshitij Aggarwal, Devansh Agarwal, Evan F. Lewis, **Reshma Anna-Thomas**, Jacob Cardinal Tremblay, Sarah Burke-Spolaor, Maura A. McLaughlin, and Duncan R. Lorimer. “Comprehensive Analysis of a Dense Sample of FRB 121102 Bursts”. In: *The Astrophysical Journal* 922.2, 115 (Dec. 2021), p. 115. doi: 10.3847/1538-4357/ac2577. arXiv: 2107.05658 [astro-ph.HE].
 2. Kshitij Aggarwal, Sarah Burke-Spolaor, Casey J. Law, Geoffrey C. Bower, Bryan J. Butler, Paul B. Demorest, T. Joseph W. Lazio, Justin Linford, Jessica Sydnor, and **Reshma Anna-Thomas**. “Robust Assessment of Clustering Methods for Fast Radio Transient Candidates”. In: *The Astrophysical Journal* 914.1, 53 (June 2021), p. 53. doi: 10.3847/1538-4357/abf92b. arXiv: 2104.07046 [astro-ph.IM].
 1. Kshitij Aggarwal, Devansh Agarwal, Joseph Kania, William Fiore, **Reshma Thomas**, Scott Ransom, Paul Demorest, Robert Wharton, Sarah Burke-Spolaor, Duncan Lorimer, Maura Mclaughlin, and Nathaniel Garver-Daniels. “Your: Your Unified Reader”. In: *The Journal of Open Source Software* 5.55, 2750 (Nov. 2020), p. 2750. doi: 10.21105/joss.02750. arXiv: 2011.07627 [astro-ph.IM].