Reshma Anna-Thomas

Curriculum vitae

Department of Physics and Astronomy,
West Virginia University,
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ReshmaAnnaThomas

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

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

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

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

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

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

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

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

Technical Strengths

	Level	Skill	Comment
Language:	■■■■■	Python	*Extensive data analysis and visualisation experience*
	■■□□□	C++, Fortran	*Basic understanding*
	■■■■■	LaTeX	*Expert*
OS:	■■■■□	Unix	*Extensive experience*
Methods	■■■■□	SLURM, Git, Bash	*Extensive*

Languages

- Malayalam — Native
- English, Tamil & Hindi — Fluent

References

- Dr. Sarah Burke-Spolaor
  Department of Physics and Astronomy
  West Virginia University
  ✉ sarahbspolaor@gmail.com

- 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
  ✉ caseyjlaw@gmail.com

Publications

10. **Reshma Anna-Thomas**, Sarah Burke-Spoalor, 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].