Dr. Malu Sudha.

malu.sudhaj@gmail.com / malu.sudha@wayne.edu +1 248-413-9291

Detroit, Michigan, U.S

Professional Experience & Education

2023 – present **Postdoctoral fellow** Department of Physics and Astronomy, Wayne State University.
Research Area: *Broadband X-ray spectro-temporal studies of neutron star low mass X-ray binaries.*
Research Advisor: Dr. Renee Ludlam, Assistant Professor, Department of Physics and Astronomy, Wayne State University, AAS HEAD Deputy Secretary

2024 **Guest Lectured** for the Astronomical Techniques (AST 4100) course at Wayne State University (5 lectures).

2017 – 2022 **Ph.D** Department of Astronomy, Osmania University, Hyderabad, India.
Senior Research Fellow, Recipient of the Department Of Science & Technology (DST) INSPIRE Fellowship.
Research topic: *X-Ray and optical studies of mass accreting binary systems using AstroSat and ground based observatories*
Supervisor: Dr. K Sriram, Asst. Professor, Department of Astronomy, Osmania University, Hyderabad, India

2014 – 2016 **Research Assistant** DST-SERB Project, Department of Astronomy, Osmania University, Hyderabad, India.
Project: *Understanding the physical and radiative structure of accretion disks in neutron star and black hole sources*

2012 – 2014 **M.Sc. Astronomy** Osmania University, Hyderabad, India
First Rank with Distinction and an aggregate GPA of 8.47 (83%).
Masters Dissertation: *Correlation study of X-Ray luminosity and rotational periods of 34030 stars from Kepler space mission data.*

2009 – 2012 **B.Sc, Physics**, St. Teresas College
Mahatma Gandhi University, Kerala, India with an aggregate GPA of 3.53 (88.25%)

Research areas of interest

- Spectro-temporal studies of X-ray binaries and optical contact binary systems
- Exploring the inner disk region of neutron star and black hole X-ray binaries
- Constrain coronal heights of neutron star and black hole X-ray binaries based on CCF and cross-spectral studies

List of Publications

12 **Sudha, Malu**, Ludlam, R. M., Altamirano, D., Cackett, E. M., & Hare, J. (2025). A Spectro-temporal View of Normal Branch Oscillations in Cygnus X-2 as Seen by NICER and NuSTAR., *978*(1), 75. doi:10.3847/1538-4357/ad9588. arXiv: 2411.12803 [astro-ph.HE]

11 Kaddouh, M. A., **Sudha, Malu**, & Ludlam, R. M. (2024). NICER Observes the Full Z-track in GX 13+1. *Research Notes of the American Astronomical Society*, *8*(9), 243. doi:10.3847/2515-5172/ad7e22. arXiv: 2409.16941 [astro-ph.HE]

10 Moutard, D. L., Ludlam, R. M., **Sudha, M.**, Buisson, D. J. K., Cackett, E. M., Degenaar, N., … Tomsick, J. A. (2024). Investigating the Ultracompact X-Ray Binary Candidate SLX 1735-269 with NICER and NuSTAR., *968*(2), 51. doi:10.3847/1538-4357/ad4a78. arXiv: 2401.12371 [astro-ph.HE]

9 Chiranjeevi, P., Sriram, K., **Malu, S.**, & Agrawal, V. K. (2023). Detection of lags in an atoll source 4U 1728-34 using AstroSat., *368*(9), 77. doi:10.1007/s10509-023-04233-y

8 Sriram, K., Chiranjeevi, P., **Malu, S.**, & Agrawal, V. K. (2021). Understanding the inner structure of accretion disk in GX 17+2: AstroSat's outlook, Impact Factor: 1.27. *Journal of Astrophysics and Astronomy*, *42*(2), 96. doi:10.1007/s12036-021-09760-0. arXiv: 2103.05794 [astro-ph.HE]

7 **Malu, S.**, Sriram, K., Harikrishna, S., & Agrawal, V. K. (2021). Exploring the inner-disc region of the atoll source 4U 1705-44 using AstroSat's SXT and LAXPC observations, Impact Factor: 5.2. *MNRAS*, *506*(4), 6203–6211. doi:10.1093/mnras/stab1892

6 **Malu, S.**, Harikrishna, S., Sriram, K., & Agrawal, V. K. (2021). Investigating the coronal structure by studying time lags in the Atoll source 4U 1705-44 using AstroSat, Impact Factor: 1.909. *Ap&SS*, *366*(9), 87. doi:10.1007/s10509-021-03992-w. arXiv: 2109.02577 [astro-ph.HE]

5 **Malu, S.**, Sriram, K., & Agrawal, V. K. (2020). Coronal vertical structure variations in normal branch of GX 17+2: AstroSat's SXT and LAXPC perspective, Impact Factor: 5.2. *MNRAS*, *499*(2), 2214–2228. doi:10.1093/mnras/staa2939

4 Sriram, K., **Malu, S.**, & Choi, C. S. (2019). Constraining the Coronal Heights and Readjustment Velocities Based on the Detection of a Few Hundred Seconds Delays in the Z Source GX 17+2. *ApJS*, *244*(1), 5. doi:10.3847/1538-4365/ab30e1

3 Sriram, K., **Malu, S.**, Choi, C. S., & Vivekananda Rao, P. (2018). Possible Presence of a Third Body in the Kepler K2 Variable EPIC 202073314. *AJ*, *155*(4), 172. doi:10.3847/1538-3881/aab355

2 Sriram, K., **Malu, S.**, Choi, C. S., & Vivekananda Rao, P. (2017). A Study of the Kepler K2 Variable EPIC 211957146 Exhibiting a Variable O Connell Effect. *AJ*, *153*(5), 231. doi:10.3847/1538-3881/aa6893

1 Sriram, K., **Malu, S.**, Choi, C. S., & Vivekananda Rao, P. (2016). ASAS J083241+2332.4: A New Extreme Low Mass Ratio Overcontact Binary System. *AJ*, *151*(3), 69. doi:10.3847/0004-6256/151/3/69

Awards and Achievements

2019 Awarded the DST AWSAR (Augmenting Writing Skills for Articulating Research) award for popular science story under the PhD Category.

2017 Awarded the Department of Science and Technology (DST, Government of India) INSPIRE Ph.D fellowship for pursuing research.

2014 Secured first rank in the post-graduate degree program in Astronomy from Department of Astronomy, Osmania University, Hyderabad, India.

2012 Elected member of the College Union of St. Teresas college, Ernakulam in the year 2012 and served as the University Union Councilor.

Workshops/Conferences

2024
- Delivered a talk at the Compact Objects in Michigan and Ontario conference, 2024. Title: A broadband spectro-temporal view of the NS LMXB Cygnus X-2.
- Attended the XRISM Community Workshop, 2024 (virtual meeting)
- Delivered a Wayne State Particle-Astro-Nuclear (PAN) Seminar talk at the Department of Physics and Astronomy, Wayne State University.
- Delivered an online colloquium talk at the Thüringer Landessternwarte (TLS) Institute, Germany.

Workshops/Conferences (continued)

- 2023 Attended the joint I-HOW & COSPAR capacity building workshop in X-ray Astronomy, X-Vision 2023, at the North-West University, Potchefstroom, South Africa.
- 2021 Delivered a talk on the Inner region of the accretion disk and jet in the Z source GX 17+2 and atoll source 4U 1705-44 for the workshop on Astrophysical jets and observational facilities: National perspective, 05-09 April 2021, ARIES Nainital, India.
- Presented a poster on the Understanding the coronal structure variations by studying time lags in the Atoll source 4U 1705-44 for the the 3 day International Seminar on January 19-21, 2021, to commemorate the completion of five years of AstroSat, organized by the Indian Space Research Organisation (ISRO), India.
- Presented a poster on Spectro-temporal studies of the Atoll source 4U 1705-44: Investigating the inner region of the accretion disk at Astronomical Society of India (ASI) meeting, 2021, jointly hosted by ICTS-TIFR Bengaluru (India), IISER Mohali (India), IIT Indore (India) and IUCAA Pune (India).
- 2020 Presented a poster on AstroSat observations of a neutron star Z source GX 17+2 at the Astronomical Society of India (ASI) meeting, 2020, held at the Indian Institute of Science Education & Research (IISER), Tirupati, India.
- 2018 Participated in the GROWTH Winter school on transient astronomy at IIT Bombay (Mumbai, India) from 3-5 December 2018.
- Delivered a talk on Evidence of a tertiary component in Kepler contact binary K2 EPIC 202073314 at the Astronomical Society of India (ASI) meeting, 2018, held at Osmania University, Hyderabad, India.
- 2017 Participated in the AstroSat data analysis workshop held at IUCAA, India from 13-26 Nov, 2017.
- Participated in the one day workshop on "Reduction of Ultra Violet Imaging Telescope data onboard ASTROSAT" organized by the Indian Institute of Astrophysics (IIA) on 30 March 2017, at IIA, Bangalore, India.
- Co-authored a work on the Anti-correlated lags in a Z source GX 17+2 at the Astronomical Society of India (ASI) meeting, 2017, held at Birla Institute of Scientific Research (BISR), Jaipur, India.
- 2016 Participated in the workshop on DATA ANALYSIS & LAXPC SCIENCE held at Tata Institute of Fundamental Research, Mumbai, India, during 18^{th} January 2016 to 21^{st} January 2016.
- Paper on KP103285: A low mass ratio overcontact binary system was presented at the Astronomical Society of India (ASI) meeting, 2016, held at the University of Kashmir at Srinagar, India.
- Participated in the "School on Best Practices in Astro-Statistics" organized by the Inter University Center for Astronomy and Astrophysics (IUCAA), held during January 28-30, 2016, at IUCAA, Pune, India.
- 2015 Paper on Study of period variation in a contact binary system KP103285 was presented at the International Conference on Celestial Mechanics and Dynamical Astronomy held during Dec 15-17, 2015, at the Maulana Azad National Urdu University, Hyderabad, India.
- 2014 Participated in the workshop on Variability of Astronomical Sources, organized by IUCAA, Pune, India during January 22-24, 2014.

Research Mentoring

- 2025-present Jacqueline Rossbach - Directed Study at Wayne State University
- 2024-present Currently mentoring Henry Ford College undergraduate students in performing NICER and NuSTAR analysis.
- 2024 Mohamad Ali Kaddouh - undergraduate summer research program at Wayne State University

Proposals & Panels

2024	Authored a successful proposal in NICER Cycle 7
2023	Served in the NICER Guest Observer Program (cycle 6) review panel.
2016-2022	Authored numerous successful proposals for optical photometric and spectroscopic observations using the 2.3 m VBT telescope (Indian Institute of Astrophysics: IIA), 1.3 m JCBT telescope (IIA) and 2 m HCT telescope (IAO, IIA).
2016-2017	Co-authored 4 successful proposals for observations using the AstroSat satellite: SXT and LAXPC instruments.

Skills

Coding	C++, FORTRAN, Python, R, SQL, XML, HTML, CSS, JavaScript, LaTeX.
Packages.	IRAF (photometry and spectroscopy), HEAsoft, AstroSat data analysis software (SXT and LAXPC), NuSTAR and NICER data analysis software.