# Curriculum Vitae

**Shalini Ganguly**
St. Mary's College of Maryland,
47645 College Drive, St. Mary's City, MD, 20686-3001
sganguly@smcm.edu (preferred), gangulyshalini1@gmail.com (personal)
https://sites.google.com/view/sgang/home

## Academic Background

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| 2017-2022 | PhD. Astronomy, University of Nevada Las Vegas, USA |
| 2015-2017 | M.Sc. Physics, Indian Institute of Technology Hyderabad, India |
| 2012-2015 | B.Sc. Physics, Calcutta University, India |

## Professional Appointments

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| 2024- | Visiting Assistant Professor of Physics, St. Mary's College of Maryland |
| 2023-2024 | Postdoctoral Scholar Astrophysics, University of Nevada Las Vegas |
| 2022-2023 | Postdoctoral Research Associate, University of North Texas |
| 2017-2022 | Graduate Teaching Assistant, University of Nevada Las Vegas |
| 2017-2021 | Summer Research Assistant, University of Nevada Las Vegas |

## Research Experience

2024 - *Dept. of Physics and Material Science, St. Mary's College of Maryland*

• Studied the general relativistic phenomenon of trapping of geodesics for charged/uncharged and massive/massless particles, due to charged polytropic fluid spheres (manuscript submitted).

• Obtained new constraints on Lorentz-invariance violation, using the method of profile likelihood, for the gamma-ray burst GRB 160625B (published).

2023-2024 *Dept. of Physics and Astronomy, University of Nevada Las Vegas*

Studied a new channel of cloud formation in ultrafast outflows in active galactic nuclei (AGNs), using state-of-the-art magneto-hydrodynamics code ATHENA++, employing adaptive mesh refinement techniques to capture growing modes of instabilities.

2022-2023 *Dept. of Physics, University of North Texas*

• Assimilated data from HST MUSE and ALMA observations, using a python script, to analyze turbulence traced by gases in H-$\alpha$ filaments of galaxy clusters, using the statistical method of structure functions.

• Worked towards developing a radiation hydrodynamics module to carry out mesas-cale simulation of sustained super-critical accretion in 3D, in high-redshift galaxies.

2017-2022 *Dept. of Physics and Astronomy, University of Nevada Las Vegas*

Doctoral thesis titled "The Effects of Winds on Accretion Disks and Spectra of X-ray Binaries and Active Galactic Nuclei ", under the supervision of Dr. Daniel Proga. Studied thermal instability-generated clumps in AGN outflows, and modeled Compton-heated disk winds in black hole binaries or AGNs.

2015-2017 *Department of Physics. IIT, Hyderabad*

• Master's thesis titled "Triplet Fermion in the light of neutrino mass and dark matter", under the supervision of Dr. Narendra Sahu.

• Analysed the statistical significance of the gamma ray burst (GRB) time lag data, claimed to justify the loop quantum gravity proposition of Lorentz invariance violation (LIV).

2016 *National Center for Radio Astrophysics (NCRA), Pune, India*
Summer project titled "Semi-numerical model of reionization", under the supervision of Dr. Tirthankar Roychowdhury.

## Research Articles in Preparation

• A. Stornelli, A. Agashe, **S. Ganguly**, J. Ripple, *Trapped Geodesics in charged polytropic fluid spheres with a cosmological constant*, submitted to Universe, MDPI.
• **S. Ganguly**, T. Waters, D. Proga, R. Dannen, *Resolving clumpy ultrafast outflows using adaptive mesh refinement*, in preparation.

## Publication List

• S. Desai & **S. Ganguly**, *Constraint on Lorentz invariance violation for spectral lag transition in GRB 160625B using profile likelihood*, The European Physical Journal C, Volume 85, article number 290, (2025).
• **S. Ganguly**, Yuan Li, Valeria Olivares, Yuanyuan Su, Francoise Combes, Sampadaa Prakash, Stephen Hamer, Pierre Guillard, and Trung Ha, *The Nature of the Motions of Multiphase Filaments in the Centers of Galaxy Clusters*, Frontiers in Astronomy and Space Sciences, vol. 10, id. 1138613 (2023).
• **S. Ganguly**, D. Proga, T. Waters, R. C. Dannen, S. Dyda, M. Giustini, T. Kallman, J. Raymond, J. Miller and P. Rodriguez-Hidalgo, *On Synthetic Absorption Line Profiles of Thermally Driven Winds from Active Galactic Nuclei*, ApJ 914 114 (2021).
• **S. Ganguly**, D.Proga, *On the wind-driven relaxation cycle in accretion disks*, The Astrophysical Journal, Volume 890, Issue 1, id.54, 8 pp. (2020).
• **S. Ganguly**, S. Desai, *Statistical significance of spectral lag transition in GRB 160625B*, Astroparticle Physics, Volume 94, p. 17-21. (2017).

## Teaching Experience

2024- *Visiting Assistant Professor, Dept. of Physics, St. Mary's College of Maryland.*
Computational Physics using Python (Topics seminar course PHYS 475), Solar System Astronomy with Labs (ASTR 154, ASTR 154L), Stellar Astronomy and Cosmology (ASTR 155), Fundamentals of Physics III (PHYS 251), College Physics I Labs (PHYS 121L) and College Physics II Labs (PHYS 122L).

2017-2022 *Graduate Teaching Assistant, Dept. of Physics, University of Nevada Las Vegas.*
General Physics Lab (PHYS 152L), Engineering Physics II Lab (PHYS 181L)

## Mentorship Experience

2025- *St. Mary's College of Maryland*
Directed Research (PHYS 475) on Stellar Spectroscopy, Bethel Habtegiorgis.

2024- *St. Mary's College of Maryland*
Teaching Assistant and Grader (PHYS 370) for ASTR 155 and ASTR 154L, Annika Kumwembe. Assisted in making a telescope manual for use by students in physics clubs and astronomy courses.

2024 *St. Mary's College of Maryland*
Co-advised a senior undergraduate student, Alex Stornelli, towards the completion of St. Mary's Project (undergraduate thesis).

2023 *University of North Texas*
Guided a Texas Academy of Mathematics and Science (TAMS) fellow, leading to co-authorship in a published research article.

2023 *University of North Texas*
Guided a physics undergraduate student towards the completion of their Senior Research Thesis. The research project was selected for an oral poster presentation at the Conferences for Undergraduate Women in Physics (CUWiP), hosted by the American Physical Society (APS).

2022 *University of Nevada Las Vegas*
Volunteered for the Graduate Professional Student Association (GPSA)/Consolidated Students of UNLV (CSUN) Mentorship Co-op program.

## Contributed Talks/Poster Presentations

2023 Dissertation Talk at the 241st American Astronomical Society (AAS) Meeting, Seattle, USA.
2022 Online Seminar at the Indian Institute of Technology, Hyderabad, India.
2021 Online Seminar Series 'Neem' at the Inter-University Center for Astronomy and Astrophysics (IUCAA), Pune, India.
2021 Polarized Radiation near Supermassive Black Holes virtual conference, organized by Princeton Center for Theoretical Science, Princeton University, NJ, USA.
2021 Relativistic Astrophysics, Theory and Observational Perspectives virtual symposium, organized by CTP PAS, Warsaw, Poland.

## Conferences and Workshops

2022 Exploring the Hot and Energetic Universe: The Third Scientific Conference Dedicated to the ATHENA X-ray Observatory, Cosmo Caixa's Museum, Barcelona (hybrid).
2021 Black Hole Accretion Disc Winds meeting, Durham University, London, UK (hybrid).
2021 European Astronomical Society (EAS) Annual meeting (virtual).
2020 AtomDB Workshop and Advanced Spectroscopy School, organized by Harvard-Smithsonian Center for Astrophysics (virtual).
2019 Advancing Theoretical Astrophysics (ATA) workshop, Anton Pannakoek Institute for Astronomy, University of Amsterdam, Netherlands.
2017 Winter School in Astronomy/Workshop on Stellar Clusters, organized by Western University, Canada (IAU), YPCST and B.M.Birla Science Center, Hyderabad, India.
2014 Introductory course in Astronomy, M.P.Birla Planetarium, Kolkata, India.
2013 UGC sponsered national seminar on Recent Advances in the Frontiers of Physics, organized by Department of Physics, Bidhannagar College, Saltlake, Kolkata, in collaboration with Indian Association for the Cultivation of Science, Jadavpur, Kolkata.

## Other Appointments

• Panelist on the NASA Astrophysics Theory Program (ATP) review panel (2023).

## Awards/Trainings

2023 Online, non-credit specialization, titled *Introduction to Data Science*, organized by IBM Skills Network, and Coursera.
2016 All India Rank of 102 in CSIR-UGC NET (National Eligibility Test), among $\sim$20,000 applicants; qualified for the Joint Research Fellowship (JRF).
2015 All India Rank of 286 in Joint Admission for M.Sc. exam, among $\sim$ 9000 applicants.

## Computing Experiences

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| Languages | C/C++, Python, FORTRAN |
| Scientific Softwares | ATHENA++ |
| Visualization softwares | Matplotlib, VisIt, yt |
| Python libraries | Astropy, scikit-learn, Numpy, Scipy |
| Developer tools | Github, Bitbucket |
| HPC clusters | NASA Pleiades, TACC Stampede2 |

## References


**Daniel Proga**
Professor
University of Nevada Las Vegas
Department of Physics and Astronomy
4505 S. Maryland Pkwy,
Las Vegas, NV 89514.
daniel.proga@unlv.edu
702-895-3507

**Timothy Waters**
Computational Astrophysicist
Los Alamos National Laboratory
Theoretical (XCP) Division
P.O. Box 1663,
Los Alamos, NM 87545.
waters@lanl.gov

**Sergei Dyda**
Postdoctoral Researcher
University of Alabama
Department of Physics and Astronomy
Box 870324
Tuscaloosa, AL 35487-0324
sd449@cornell.edu
205-348-9124

**Rebecca Martin**
Professor
University of Nevada Las Vegas
Department of Physics and Astronomy
4505 S. Maryland Pkwy,
Las Vegas, NV 89514.
rebecca.martin@unlv.edu
702-895-3563