Shubham Kejriwal

Ph.D. Student · Physics
orcid.org/0009-0004-5838-1886

National University of Singapore, Science Drive 4, Singapore 119077
shubhamkejriwal@u.nus.edu | perturber.github.io/shubham/ | github.com/perturber

Professional Summary

Third-year Ph.D. candidate studying gravitational wave sources for the upcoming LISA mission. Experience in the LISA data analysis pipeline, modeling and inference of astrophysical environments and modified-gravity effects, waveform development, and search for electromagnetic counterparts of extreme-mass-ratio inspirals. Proficient in Bayesian statistics and machine learning with a working knowledge of general-relativistic waveform modeling.

Education

National University of Singapore (NUS) *Singapore*
Ph.D. Physics *2023 —*

- Gravitational Waves Group, Department of Physics, Faculty of Science, NUS
- Supervisor: Prof. Alvin J. K. Chua

Shiv Nadar University *Delhi, India*
B.Sc. (Research) in Physics with a Minor in Mathematics (distinction) *2018 — 2022*

- Undergraduate Thesis: "On the Effects of Relative Motion on Gravitational Waves from Extreme-Mass-Ratio Inspirals".
- Supervisor: Prof. Alvin J. K. Chua

Teaching and Mentoring

Teaching and Teaching Assistance

- HS1502 "Conceptual Introduction to Machine Learning", NUS.
  (2023-24: Semester 2, 2024-25: Semester 1).
- COS1000 "Computational Thinking for Scientists", NUS.
  (2023-24: Semester 1 and 2, 2024-25: Semester 1).
- PC5252 "Bayesian Statistics and Machine Learning", NUS.
  (2023-24: Semester 1, 2024-25: Semester 2).

Student Mentoring

- (co-advisor) Ms. Swathi Ganesh, B.Sc. Physics, Shiv Nadar University. Short term project (2025).
- (co-advisor) Ms. Sheena Abigail, M.Sc. Physics, NUS. Final year project (2024-25).

Publications

Total *7* articles available as preprints or publications. Also see inspire-HEP and arXiv.

- J. Chakraborty, L. V. Drummond, M. Bonetti, A. Franchini, **S. Kejriwal**, et al. (2025)
  Prospects for EMRI/MBH parameter estimation using Quasi-Periodic Eruption timings; (arXiv, accepted by ApJ)
- C. E. A. Chapman-Bird, L. Speri, Z. Nasipak, O. Burke, M. L. Katz, A. Santini, **S. Kejriwal**, et al. (2025)
  Efficient Waveforms for asymmetric-mass eccentric equatorial inspirals into rapidly-spinning black holes; (arXiv).
- **S. Kejriwal**, F. Duque, A. J. K. Chua, J. Gair (2025)
  Bias-Corrected Importance Sampling for Inferring Beyond Vacuum-GR Effects in Gravitational Wave Sources; (PRD).
- F. Duque, **S. Kejriwal**, L. Sberna, L. Speri, J. Gair (2024)
  Constraining accretion physics with gravitational waves from eccentric extreme-mass-ratio inspirals; (PRD).
- D. R. Pasham, **S. Kejriwal**, E. Coughlin, V. Witzany, A. J. K. Chua, M. Zajaček, T. Wevers, Y. Ajay (2024)
  Alive and Strongly Kicking: Stable X-ray Quasi-Periodic Eruptions from eRO-QPE2 over 3.5 Years; (arXiv).

- **S. Kejriwal,** V. Witzany, M. Zajaček, D. R. Pasham, A. J. K. Chua. (2024)
  Repeating Nuclear Transients as Candidate Electromagnetic Counterparts of LISA Extreme Mass Ratio Inspirals;(MNRAS).
- **S. Kejriwal,** L. Speri, A. J. K. Chua. (2024)
  Impact of Correlations on the Modeling and Inference of Beyond Vacuum-GR Effects in Extreme-Mass-Ratio Inspirals; (PRD).

Presentations

Talks

2025

- Astroparticle Physics Group Seminar Talk, SISSA, Trieste, Italy (invited).
- Gravitational Physics Group Talk, ETH Zurich, Switzerland (invited).
- EMRI Search and Inference within the LISA Global Fit - Part I, University of Paris, Paris, France.
- Astroparticle and Cosmology Laboratory (APC) Seminar Talk, Paris, France.
- 245th American Astronomical Society Meeting, Washington D.C., Special Session on Repeating Transients, (invited review talk, declined).

2024

- LISA Meeting Talk, Max Planck Institute for Gravitational Physics (AEI), Potsdam, Germany (invited).
- 15th International LISA Symposium 2024, University College, Dublin, Ireland.
- 17th Marcel Grossmann Meeting (MGXVII), The 'Gabriele d'Annunzio' University, Italy (invited, declined).
- 27th Capra Meeting on Radiation Reaction in General Relativity, NUS, Singapore.
- LIGO Seminar Talk, Caltech, California, USA.
- Gravity Theory Group Seminar Talk, University of Illinois, Urbana-Champaign (UIUC), Illinois, USA (remote, invited).

2023

- Amaldi15 - Premiere International Conference on Gravitational Waves (remote).
- 1st Trieste Meeting on the Physics of Gravitational Waves, SISSA, Trieste, Italy.

Posters

2024

- Faculty of Science 95th Anniversary Symposium, Department of Physics, NUS, Singapore.
- Physics Engagement Camp, Department of Physics, NUS, Singapore.

Discussions

2025

- Enabling Future GW Astrophysics in the mHz Regime, MIAPbP, Garching, Germany. "Including environmental effects in GW waveforms" (co-chair).
- EMRI Search and Inference within the LISA Global Fit - Part I, Astroparticle and Cosmology Laboratroy (APC), Paris, France. "Data Analysis Strategies" (co-chair).

2024

- 27th Capra Meeting on Radiation Reaction in General Relativity, NUS, Singapore. "Priorities for EMRI science" (co-chair).

Honors

Awards

- NUS Department of Physics Best Researcher Award (2025).
- Dean's List Academic Excellence Award, Shiv Nadar University (2019, 2020).

Scholarships

- NUS Research Scholarship (2023-2027).

Contributions

Collaborations

- LISA Consortium (core member) — Waveform WG, Data Analysis WG, Fundamental Physics WG; LISA Asia Member.
- LISA Figures of Merit, Science Objective 3: “Probe the dynamics of dense nuclear clusters using EMRIs”.
- `StableEMRIFisher(SEF)` Core Contributor.
- `FastEMRIWaveforms(FEW)` Core Contributor.

Participation

- Mathematical Methods for the General Relativistic Two-body Problem, August 2025, NUS, Singapore.
- Enabling Future Gravitational Wave Astrophysics in the Milli-Hertz Regime, July 2025, MIAPbP, Munich, Germany.
- EMRI Search and Inference within the LISA Global Fit - Part I, June 2025, Astrophysics and Cosmology Laboratory (APC), Paris, France.
- Beyond the Horizon: Testing the Black Hole Paradigm, March 2025, ICTS-TIFR, Bengaluru, India.
- LISA Sprint Workshop, April 2024, Caltech, California, USA.

Others

- Referee for Physical Review D.
- AstroChallenge Singapore (2025), Project Round Judge.
- 27th Capra Meeting on Radiation Reaction in General Relativity (2024), Local Organizing Committee.
- Annual Physics Conference (2023 and 2025), Department of Physics, NUS, Singapore, Organizing Committee.