

Riccardo Buscicchio | Curriculum Vitæ

riccardo.buscicchio@unimib.it • www.riccardobuscicchio.com • December 13, 2025

Relativistic astrophysicist, advanced data analysis and statistical frameworks for Bayesian and frequentist inference. Space-mission modelling, signal detection and parameter estimation in gravitational-wave astronomy. Gravitational-wave lensing. Population inference, stochastic background searches. Milky Way morphology, supernovae precursors, supermassive black holes accretion model inference.

Contacts

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Nationality: Italy

Website & publications record: www.riccardobuscicchio.com – arXiv – ORCID

Academic positions

Università degli Studi di Milano-Bicocca

Milan, Italy

Postdoc (Assegnista di ricerca), Department of Physics "G.Occhialini"

2021 - 2024

- *Main activity:* development of LISA data analysis ground-segment for the Italian Space Agency (Phase A).

Università degli Studi di Milano-Bicocca

Milan, Italy

Postdoc (Assegnista di ricerca), Department of Physics "G.Occhialini"

2024 - current

- *Main activity:* development of LISA data analysis ground-segment for the Italian Space Agency (Phase B).

Education

University of Birmingham

Birmingham, UK

Ph.D., School of Physics & Astronomy

2017-13/07/2022

- *Supervisor:* A. Vecchio. Thesis resulted in 6 short-author publications.
- *Thesis Title:* Topics in Bayesian population inference for Gravitational Wave Astronomy

This thesis explores a number of topics related to Bayesian inference in gravitational-wave astronomy. From hierarchical inference on population of stellar mass binary black hole mergers, to the development of an end-to-end parameter estimation routine for space-based interferometers. Other topics are investigated: population of binary white dwarfs in satellite galaxies of the Milky Way; constraints from stochastic background on lensing of gravitational waves from binary neutron star and binary black hole mergers; statistical techniques for simultaneous inference on multiple undistinguishable sources.

Università degli Studi di Pisa

Pisa, Italy

Master's degree in Theoretical physics

2013-2016

- *Final degree grade:* 110/110
- *Supervisor:* G. Cella. Thesis resulted in one short-author publications.
- *Thesis title:* An improved detector for non-gaussian stochastic background of gravitational waves.

This thesis explored the idea of using functional formalism from stochastic processes and classical field theory to develop a new detection algorithm, with improved performance, for non-gaussian stochastic backgrounds of gravitational waves.

Columbia University

New York NY, USA

INFN-NSF Summer Internship

Jun-Sept 2013

- *Supervisor:* S. Marka, I. Bartos.

We estimated the contribution to noise level in second and third generation ground-based detectors due to primary and secondary cosmic ray showers impinging on the interferometer mirrors.

Università degli Studi di Pisa

Pisa, Italy

Bachelor's degree in Physics

2008-2012

- *Final degree grade:* 109/110.
- *Thesis title:* Template banks for gravitational wave detection: an application of Information Geometry.

This thesis explored the idea of using differential geometry formalism (as defined in the context of Information theory) to develop a template placing algorithm over source parameter space with non-trivial manifold structure.

Metrics

Publications:

- 32** short-author papers published in major peer-reviewed journals
(out of which **8** first-authored papers and **8** lead by supervised student).
- 13** collaboration papers with substantial contribution, published in major peer-reviewed journals
- 60** collaboration papers in total, published in major peer-reviewed journals
- 8** papers in submission stage,
- 2** other publications (thesis, white papers, reviews)

Total number of citations: >17000. h-index: 25 (from ADS and iNSPIRE record).

Web links to list services: [ADS](#); [iNSPIRE](#); [arXiv](#); [orcid](#).

Full list of publications available below and at www.riccardobuscicchio.com/publications.

Full list of presentations available below and at www.riccardobuscicchio.com/talks.

Codes & Datasets

Title	Code	Dataset	Zenodo DOI	Public
○ Bahamas Galactic Foreground	✓	✓	10.5281/zenodo.17527235	✓
○ Bahamas	✓		10.5281/zenodo.16087705	✓
○ Hypertriangulation Map	✓		10.5281/zenodo.13897708	✓
○ Bayesian PowerLaw Sensitivity	✓	✓	10.5281/zenodo.14384633	✓
○ Milky Way Satellites		✓	10.5281/zenodo.3668904	✓
○ LISA stellar BBH catalogues and samples	✓	✓	10.5281/zenodo.14426778	✓
○ LISA MBHB catalogues and samples		✓	10.5281/zenodo.13787674	✓
○ Chirp Gravitational Wave Alerts	✓		10.5281/zenodo.3525063	✓

Grants, Prizes, & Awards

Career prizes:

- Braccini PhD Thesis Prize, Gravitational Wave International Committee honorable mention. 2021
- Michael Penston PhD Thesis Prize, Royal Astronomical Society runner-up prize. 2021

Grants:

- Royal Society of Edinburgh "Gravity under the lens" (col, PI Dr. Berry, Univ. of Glasgow, UK) 2025-2027
- EuroHPC PRACE "LABELFIT" proposal, 224k CPUh on Leonardo DCGP 2025
- EuroHPC PRACE "LISA-FIT" proposal, 100k CPUh on Leonardo BOOSTER 2023
- Google Cloud for Researchers, 4kEUR Google Cloud Research Credits 2023
- CINECA ISCRA Type-C project "LISA-MW" proposal, 10k CPUh at the Italian National HPC center. 2022
- Travel Grant, Horizon 2020 AHEAD 2020 (High Energy Astrophysics) 2021
- Travel Grant, American Physical Society, DGRAV Student Travel Grant 2020
- Travel Grant, Institute of Physics Student Travel fund 2019
- Travel Grant, Royal Astronomical Society, UK. 2018

Invited research visits:

- Kavli visitor program research visit — DAMTP Univ. Cambridge, Cambridge, UK 07/10/2024-18/10/2024
- Research visit — Max Planck Institute for Astrophysics, Garching, DE 23/11/2023-30/11/2023
- Research visit — Albert Einstein Institute, Potsdam, DE 16/04/2023-23/04/2023
- Research visit — Univ. of Stavanger, Stavanger, NO 08/02/2023-29/03/2023
- AHEAD 2020 program research visit — APC, Univ. Paris Diderot, Paris, FR 01/12/2023-07/01/2023
- Research visit — APC, Univ. Paris Diderot, Paris, FR 26/10/2022-30/11/2022
- Research visit — Univ. of Stavanger, Stavanger, NO 26/09/2022-19/10/2022

- Research visit — Univ. of Birmingham, Birmingham, UK 05/07/2022-10/07/2022
 - Research visit — Columbia University, New York, US 06/04/2022-13/04/2022

Student supervision

According to current national regulations, as a research fellow I cannot be officially appointed as supervisor of students at any level. However, upon agreement with the relevant permanent staff, I have supervised the work of students in the percentages shown below.

Ph.D. student co-supervisor:

- B. Saiguhan, University of Milano-Bicocca, PhD, 100% 2025-2028
 - L. Viganò, University of Milano-Bicocca, PhD, 80% 2025-2028
 - F. Nobili, University of Insubria, PhD, 100% 2024-2027
 - A. Spadaro, University of Milano-Bicocca, PhD, 100% 2022-2025
 - F. Pozzoli, University of Insubria, PhD, 100% 2022-2025

MSc student co-supervision:

- R. Bosoni De Martini, University of Milano-Bicocca, Master's thesis, 100% 2025-2026
 - L. Viganò, University of Milano-Bicocca, Master's thesis, 100% 2024-2025
(now PhD student at Univ. of Milano-Bicocca)
 - M. Bellotti, University of Milano-Bicocca, Master's thesis, 100% 2024-2025
(now PhD student at Observatoire Cote d'Azur)
 - D. Chirico, University of Milano-Bicocca, Master's thesis, 100% 2023-2024
 - S. Corbo, Politecnico di Milano, Master's thesis, 100% 2023-2024
 - R. Rosso, University of Pisa, Master's thesis, 80% 2023-2024
(now PhD student at Univ. of Pisa)
 - G. Astorino, University of Pisa, Master's thesis, 80% 2023-2024
(now PhD student at Univ. of Pisa)
 - M. Piarulli, University of Milano-Bicocca, Master's thesis, 100% 2022-2023
(now PhD student at Univ. of Toulouse)
 - A. Spadaro, University of Milano-Bicocca, Master's thesis, 100% 2021-2022
(now PhD student at Univ. of Milano-Bicocca)
 - A. Carzaniga, University of Milano-Bicocca, Master's thesis, 100% 2021-2022
 - A. Geminardi, University of Milano-Bicocca, Master's thesis, 100% 2021-2022
(now PhD student at Univ. of Pavia)
 - E. Finch, University of Birmingham, Year 4 project, 50% 2018
 - V. Spasova, University of Birmingham, Year 4 project, 50% 2018

BSc student supervision:

- H. P. G. Carabajo, University of Milano-Bicocca, Bachelor's thesis, 100% 2023-2024

Taught classes

- **Inference models in LISA**, PhD course, Univ. of Trento (Italy). 2026
 - **Current and future challenges in GW astronomy**, PhD course, Milano-Bicocca (Italy). 2023
Content: Introduction to gravitational-wave data analysis.
Space-based and ground-based interferometers.
Source populations: compact object binaries, stochastic backgrounds.
 - **Mathematical physics and gravity** (MAF900), PhD course, Univ. of Stavanger (Norway). 2023
Content: Introduction to gravitational-wave data analysis. Space-based interferometers.
Source populations: compact object binaries, stochastic backgrounds.
Signal modeling: galactic and extragalactic compact object binaries
astrophysical and cosmological stochastic backgrounds.
Signal detection and parameter estimation: frequentist and Bayesian approaches.
Advanced stochastic sampling techniques.
 - **Lecture in Astrostatistics** (F5802Q014/20), Astrophysics MSc, Univ. of Milano-Bicocca (Italy) 2022
Content: Source populations: compact object binaries, stochastic backgrounds.

Introduction to gravitational-wave data analysis. Space-based interferometers.
Signal detection and parameter estimation: frequentist and Bayesian approaches.

Tutoring	Acad.Year
o Python Computing Lab , Bachelor's degree in Physics, Univ. of Birmingham, UK Content: Python programming, simulation of physical systems in celestial and classical mechanics, thermodynamics, electromagnetism. Data analysis.	2017-2021
o Maths for physicists , Bachelor's degree in Physics, Univ. of Birmingham, UK Content: Linear algebra, differential and integral calculus, differenzial equations Groups and representations theory	2017-2019
o Physics and communication skills , Master's degree in Physics, Univ. of Birmingham, UK. Content: \LaTeX basics. Drafting of lab reports, publications, seminars	2019

Academic service, editorial and research responsibilities

International collaboration responsibilities

- o LISA Consortium AstroWG coordinator, project “Updatable predictions for stBBH in LISA” 2025-2026
- o PAQA co-chair of the Coordination Unit L2D (Global Fit, ESA LISA Project Office) 2024-2026
- o DDPC-Italy Lead of the LISA DDPC national coordination initiative 2024-2026

Journal referee

- o Physical Review Letters
- o The Astrophysical Journal Letters
- o Journal of Cosmology and Astroparticle Physics
- o Monthly Notices of the Royal Astronomical Society
- o Institute of Physics Machine Learning: Science and Technology
- o Physical Review D
- o The Open Journal of Astrophysics
- o NASA Technology Transfer Program
- o IoP Classical and Quantum Gravity
- o Institute of Physics Trusted Reviewer Excellence program

Editorial responsibilities

- o Editorial board Lensing working group in the LIGO,Virgo, KAGRA collaboration 2023
- o Co-editor of a Living Review in relativity issue on “LISA data analysis” 2022-2023

Conference organizer

- o LISA Without Frontiers Workshop Sprint Session Coach, Sexten, IT. 2026
- o LISA Distributed Data Processing Center June Workshop, Milan, IT. 2025
- o IFPU focus week on “Emerging methods in GW population inference”, Trieste, Italy. 2024
- o LISA Astrophysics Working Group Conference, Birmingham, UK. 2022
- o Gravitational-wave populations: what's next?, Milan, Italy. 2023
- o Gravitational-wave Excellence Alliance Training (GrEAT) PhD school, Birmingham, UK. 2019
- o Gravitational-wave Open Science Center First Open Data Workshop, (online) 2019

Outreach & public engagement

- o Orientation activities for high-school students as part of the PNRR Orientation project, Milan, Italy. 2024-2025
- o Development of illustrations and animations for LISA Consortium 2023
- o Development of illustrations and graphic content for LIGO Magazine 2022-2023
- o Development of visualisation interface and skymaps content for GW alerts web and smartphone app. <https://chirp.sr.bham.ac.uk> 2022-2023
- o Organization of biweekly public engagement events “Astronomy in the city”, Birmingham, UK 2017-2021
- o Organizer of the “PhD meet and greet” event series, University of Birmingham 2021
- o Lectures to high-school students, Italy since 2021

Professional recognition and service

- o National Scientific Habilitation (ASN) as associated professor. 2023
in Astrophysics, Cosmology and Space Science (GSD 02/PHYS-05 - PHYS-05/A)
- o French Qualification for teaching in Higher Education in Astrophysics (Sec.34), French Ministry of higher education and research (qualification no.23234388826). 2023
- o LSC Academic Advisory Committee. 2019-2021
- o Secretary for the Research Fellows Council, University of Milano-Bicocca 2024-2025

- Research Fellow Representative, Department of Physics, University of Milano-Bicocca 2023-2025

Memberships

- LISA Distributed Data Processing Center, full member. since 2024
- LISA Consortium, core member. since 2018
- Italian Center for Supercomputing (ICSC). since 2021
- TEONGRAV National Initiative (Gravity Theory)
Italian National Institute for Nuclear Physics (INFN). since 2021
- LIGO, Virgo, Kagra Collaboration, full member. since 2017
- Italian Society of General Relativity and Gravitational Physics (SIGRAV) since 2021
- Istituto Nazionale di Astrofisica (INAF) since 2021
- American Physical Society (APS), member.
- Italian Physical Society (SIF), member 2021
- Royal Astronomical Society (RAS), fellow. 2018-2021

Skills

Programming languages: Python (advanced), Bash (advanced), Julia (advanced), R (advanced), Mathematica, Go, Stan, C, Qt5.

Other scientific tools: PyTorch, TensorFlow, LIGO lalsuite, \LaTeX , git, HPC tools, containerization, continuous integration, cloud computing, web development.

Languages: English (fluent), Italian (native), French (basic)

Hobbies

Swimming, running, rock climbing, photography. Sci-fi books, electronic music.

Publications

Submitted short-author and collaboration papers which I have substantially contributed to:

Supervised students publications marked with *.

- 8.* *samsara: A Continuous-Time Markov Chain Monte Carlo Sampler for Trans-Dimensional Bayesian Analysis.*
G. Astorino, L. Valbusa Dall'Armi, **R. Buscicchio**, J. Pomper, A. Ricciardone, W. Del Pozzo.
[arXiv:2511.07385 \[stat.CO\]](https://arxiv.org/abs/2511.07385).
7. *The first year of LISA Galactic foreground.*
R. Buscicchio, F. Pozzoli, D. Chirico, A. Sesana.
[arXiv:2511.03604 \[astro-ph.IM\]](https://arxiv.org/abs/2511.03604).
6. *Functional inference on deviations from General Relativity.*
C. Pacilio, **R. Buscicchio**.
[arXiv:2507.13454 \[gr-qc\]](https://arxiv.org/abs/2507.13454).
5. *GWTC-4.0: Updating the Gravitational-Wave Transient Catalog with Observations from the First Part of the Fourth LIGO-Virgo-KAGRA Observing Run.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
[arXiv:2508.18082 \[gr-qc\]](https://arxiv.org/abs/2508.18082).
4. *Comparing astrophysical models to gravitational-wave data in the observable space.*
A. Toubiana, D. Gerosa, M. Mould, S. Rinaldi, M. Arca Sedda, T. Bruel, **R. Buscicchio**, J. Gair, L. Paiella, F. Santoliquido, R. Tenorio, C. Ugolini.
[arXiv:2507.13249 \[gr-qc\]](https://arxiv.org/abs/2507.13249).
- 3.* *Bahamas: BAyesian inference with HAmiltonian Montecarlo for Astrophysical Stochastic background.*
F. Pozzoli, **R. Buscicchio**, A. Klein, D. Chirico.
[arXiv:2506.22542 \[astro-ph.IM\]](https://arxiv.org/abs/2506.22542).
2. *LISA Definition Study Report.*
M. Colpi, K. Danzmann, M. Hewitson, K. Holley-Bockelmann, et al. (incl. **R. Buscicchio**).
[arXiv:2402.07571 \[astro-ph.CO\]](https://arxiv.org/abs/2402.07571).
1. *The last three years: multiband gravitational-wave observations of stellar-mass binary black holes.*
A. Klein, G. Pratten, **R. Buscicchio**, P. Schmidt, C. J. Moore, E. Finch, A. Bonino, L. M. Thomas, N. Williams, D. Gerosa, S. McGee, M. Nicholl, A. Vecchio.
[arXiv:2204.03423 \[astro-ph.HE\]](https://arxiv.org/abs/2204.03423).

Short-author papers published in major peer-reviewed journals:

Supervised students publications marked with *.

- 32.* *Environmental effects in the LISA stochastic signal from stellar-mass black hole binaries.*
R. Chen, R. S. Chandramouli, F. Pozzoli, **R. Buscicchio**, E. Barausse.
Physical Review D 112, (2025) 084053. [arXiv:2507.00694 \[gr-qc\]](https://arxiv.org/abs/2507.00694).
31. *Variability in the massive black hole binary candidate SDSS J2320+0024: no evidence for periodic modulation.*
F. Rigamonti, L. Bertassi, **R. Buscicchio**, F. Cocchiararo, S. Covino, M. Dotti, A. Sesana, P. Severgnini.
Astronomy & Astrophysics 702 (2025) A242. [arXiv:2505.22706 \[astro-ph.GA\]](https://arxiv.org/abs/2505.22706).
- 30.* *Is the stochastic signal really detectable?.*
F. Pozzoli, J. Gair, **R. Buscicchio**, L. Speri.
Physical Review D 112, (2025) 064035. [arXiv:2412.10468 \[astro-ph.IM\]](https://arxiv.org/abs/2412.10468).
29. *A test for LISA foreground Gaussianity and stationarity. I. Galactic white-dwarf binaries.*
R. Buscicchio, A. Klein, V. Korol, F. Di Renzo, C.J. Moore, D. Gerosa, A. Carzaniga.
European Physical Journal C 85, (2025) 887. [arXiv:2410.08263 \[astro-ph.HE\]](https://arxiv.org/abs/2410.08263).
- 28.* *Accelerating LISA inference with Gaussian processes.*
J. El Gammal, **R. Buscicchio**, G. Nardini, J. Torrado.
Physical Review D 112, (2025) 063010. [arXiv:2503.21871 \[astro-ph.HE\]](https://arxiv.org/abs/2503.21871).
- 27.* *Test for LISA foreground Gaussianity and stationarity: extreme mass-ratio inspirals.*
M. Piarulli, **R. Buscicchio**, F. Pozzoli, O. Burke, M. Bonetti, A. Sesana.
Physical Review D 111, (2025) 103047. [arXiv:2410.08862 \[astro-ph.HE\]](https://arxiv.org/abs/2410.08862).
- 26.* *Cyclostationary signals in LISA: a practical application to Milky Way satellites.*
F. Pozzoli, **R. Buscicchio**, A. Klein, V. Korol, A. Sesana, F. Haardt.
Physical Review D 111, (2025) 063005. [arXiv:2410.08274 \[astro-ph.GA\]](https://arxiv.org/abs/2410.08274).

25. *Characterization of non-Gaussian stochastic signals with heavier-tailed likelihoods.*
 N. Karnesis, A. Sasli, **R. Buscicchio**, N. Stergioulas.
[Physical Review D 111, \(2025\) 022005. arXiv:2410.14354 \[gr-qc\]](#).
24. *Stellar-mass black-hole binaries in LISA: characteristics and complementarity with current-generation interferometers.*
R. Buscicchio, J. Torrado, C. Caprini, G. Nardini, M. Pieroni, N. Karnesis, A. Sesana.
[Journal of Cosmology and Astroparticle Physics 01 \(2025\) 084. arXiv:2410.18171 \[astro-ph.HE\]](#).
- 23.* *Stars or gas? Constraining the hardening processes of massive black-hole binaries with LISA.*
 A. Spadaro, **R. Buscicchio**, D. Izquierdo-Villalba, D. Gerosa, A. Klein, G. Pratten.
[Physical Review D 111, \(2025\) 023004. arXiv:2409.13011 \[astro-ph.HE\]](#).
22. *Partial alignment between jets and megamasers: coherent or selective accretion?.*
 M. Dotti, **R. Buscicchio**, F. Bollati, R. Decarli, W. Del Pozzo, A. Franchini.
[Astronomy & Astrophysics 692 \(2024\) A233. arXiv:2403.18002 \[astro-ph.GA\]](#).
21. *Expected insights on type Ia supernovae from LISA's gravitational wave observations.*
 V. Korol, **R. Buscicchio**, Ruediger Pakmor, Javier Morán-Fraile, Christopher J. Moore, Selma E. de Mink.
[Astronomy & Astrophysics 691 \(2024\) A44. arXiv:2407.03935 \[astro-ph.HE\]](#).
- 20.* *A weakly-parametric approach to stochastic background inference in LISA.*
 F. Pozzoli, **R. Buscicchio**, C. J. Moore, A. Sesana, F. Haardt, A. Sesana.
[Physical Review D 109, \(2024\) 083029. arXiv:2311.12111 \[astro-ph.CO\]](#).
19. *A fast test for the identification and confirmation of massive black hole binary.*
 M. Dotti, F. Rigamonti, S. Rinaldi, W. Del Pozzo, R. Decarli, **R. Buscicchio**.
[Astronomy & Astrophysics 680 \(2023\) A69. arXiv:2310.06896 \[astro-ph.HE\]](#).
- 18.* *Glitch systematics on the observation of massive black-hole binaries with LISA.*
 A. Spadaro, **R. Buscicchio**, D. Vetrugno, A. Klein, D. Gerosa, S. Vitale, R. Dolesi, W. J. Weber, M. Colpi.
[Physical Review D 108 \(2023\) 123029. arXiv:2306.03923 \[gr-qc\]](#).
17. *Implications of pulsar timing array observations for LISA detections of massive black hole binaries.*
 N. Steinle, H. Middleton, C. J. Moore, S. Chen, A. Klein, G. Pratten, **R. Buscicchio**, E. Finch, A. Vecchio.
[Monthly Notices of the Royal Astronomical Society 525 2 \(2023\). arXiv:2305.05955 \[astro-ph.HE\]](#).
16. *Parameter estimation of binary black holes in the endpoint of the up-down instability.*
 V. De Renzis, D. Gerosa, M. Mould, **R. Buscicchio**, L. Zanga.
[Physical Review D 108 \(2023\) 024024. arXiv:2304.13063 \[gr-qc\]](#).
15. *Improved detection statistics for non Gaussian gravitational wave stochastic backgrounds.*
 M. Ballelli, **R. Buscicchio**, B. Patricelli, A. Ain, G. Cella.
[Physical Review D 107 \(2023\) 124044. arXiv:2212.10038 \[gr-qc\]](#).
14. *Detecting non-Gaussian gravitational wave backgrounds: a unified framework.*
R. Buscicchio, A. Ain, M. Ballelli, G. Cella, B. Patricelli.
[Physical Review D 107 \(2023\) 063027. arXiv:2209.01400 \[gr-qc\]](#).
13. *Detectability of a spatial correlation between stellar-mass black hole mergers and Active Galactic Nuclei in the Local Universe.*
 N. Veronesi, E.M. Rossi, S. van Velzen, **R. Buscicchio**.
[Monthly Notices of the Royal Astronomical Society 514 2 \(2023\). arXiv:2203.05907 \[astro-ph.HE\]](#).
12. *Bayesian parameter estimation of stellar-mass black-hole binaries with LISA.*
R. Buscicchio, A. Klein, E. Roebber, C. J. Moore, D. Gerosa, E. Finch, A. Vecchio.
[Physical Review D 104 \(2021\) 044065. arXiv:2106.05259 \[astro-ph.HE\]](#).
11. *An Interactive Gravitational-Wave Detector Model for Museums and Fairs.*
 S. J. Cooper, A. C. Green, H. R. Middleton, C. P. L. Berry, **R. Buscicchio**, E. Butler, C. J. Collins, C. Gettings, D. Hoyland, A. W. Jones, J. H. Lindon, I. Romero-Shaw, S. P. Stevenson, E. P. Takeva, S. Vinciguerra, A. Vecchio, C. M. Mow-Lowry, A. Freise.
[American Journal of Physics 89 \(2021\) 702–712. arXiv:2004.03052 \[physics.ed-ph\]](#).
10. *Evidence for hierarchical black hole mergers in the second LIGO–Virgo gravitational-wave catalog.*
 C. Kimball, C. Talbot, C.P.L. Berry, M. Zevin, E. Thrane, V. Kalogera, **R. Buscicchio**, M. Carney, T. Dent, H. Middleton, E. Payne, J. Veitch, D. Williams .
[Astrophysical Journal Letters 915 \(2021\) L35. arXiv:2011.05332 \[astro-ph.HE\]](#).
9. *Testing general relativity with gravitational-wave catalogs: the insidious nature of waveform systematics.*
 C. J. Moore, E. Finch, **R. Buscicchio**, D. Gerosa.
[iScience 24 \(2021\) 102577. arXiv:2103.16486 \[gr-qc\]](#).

8. *LoCuSS: The flashback radius of massive galaxy clusters and its dependence on cluster merger history.*
M. Bianconi, **R. Buscicchio**, G. P. Smith, S. L. McGee, C.P. Haines, A. Finoguenov, A. Babul.
Astrophysical Journal 911 (2021) 136. arXiv:2010.05920 [astro-ph.GA].
7. *Search for Black Hole Merger Families.*
D. Veske, A. G. Sullivan, Z. Marka, I. Bartos, K. R. Corley, J. Samsing, **R. Buscicchio**, S. Marka.
Astrophysical Journal Letters 907 (2021) L48. arXiv:2011.06591 [astro-ph.HE].
6. *Constraining the lensing of binary black holes from their stochastic background.*
R. Buscicchio, C. J. Moore, G. Pratten, P. Schmidt, M. Bianconi, A. Vecchio.
Physical Review Letters 125 (2020) 141102. arXiv:2006.04516 [astro-ph.CO].
5. *Constraining the lensing of binary neutron stars from their stochastic background.*
R. Buscicchio, C. J. Moore, G. Pratten, P. Schmidt, A. Vecchio.
Physical Review D 102 (2020) 081501 . arXiv:2008.12621 [astro-ph.HE].
4. *Measuring precession in asymmetric compact binaries.*
G. Pratten, P. Schmidt, **R. Buscicchio**, L. M. Thomas.
Physical Review Research 2 (2020) 043096. arXiv:2006.16153 [gr-qc].
3. *Populations of double white dwarfs in Milky Way satellites and their detectability with LISA.*
V. Korol, S. Toonen, A. Klein, V. Belokurov, F. Vincenzo, **R. Buscicchio**, D. Gerosa, C. J. Moore, E. Roebber, E. M. Rossi, A. Vecchio.
Astronomy & Astrophysics 638 (2020) A153. arXiv:2002.10462 [astro-ph.GA].
2. *Milky Way satellites shining bright in gravitational waves.*
E. Roebber, **R. Buscicchio**, A. Vecchio, C. J. Moore, A. Klein, V. Korol, S. Toonen, D. Gerosa, J. Goldstein, S. M. Gaebel, T. E. Woods.
Astrophysical Journal Letters 894 (2020) L15. arXiv:2002.10465 [astro-ph.GA].
1. *Label Switching Problem in Bayesian Analysis for Gravitational Wave Astronomy.*
R. Buscicchio, E. Roebber, J. M. Goldstein, C. J. Moore .
Physical Review D 100 (2019) 084041. arXiv:1907.11631 [astro-ph.IM].

Collaboration papers, with substantial contribution, published in major peer-reviewed journals:

13. *Search for gravitational-lensing signatures in the full third observing run of the LIGO-Virgo network.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Astrophysical Journal 970 (2021) 191. arXiv:2304.08393 [gr-qc].
12. *GWTC-2.1: Deep Extended Catalog of Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Physical Review D 109 (2024) 022001. arXiv:2108.01045 [gr-qc].
11. *The population of merging compact binaries inferred using gravitational waves through GWTC-3.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Physical Review X 13 (2021) 011048. arXiv:2111.03634 [astro-ph.HE].
10. *Tests of General Relativity with GWTC-3.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Physical Review D (in press). arXiv:2112.06861 [gr-qc].
9. *Search for lensing signatures in the gravitational-wave observations from the first half of LIGO-Virgo's third observing run.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Astrophysical Journal Letters (2021) 923. arXiv:2105.06384 [gr-qc].
8. *GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
Physical Review X 13 (2023) 041039. arXiv:2111.03606 [gr-qc].
7. *Observation of gravitational waves from two neutron star-black hole coalescences.*
LIGO Scientific Collaboration, Virgo Collaboration.
Astrophysical Journal Letters, 915, L5 (2021). arXiv:2106.15163 [astro-ph.HE].
6. *GWTC-2: Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run.*
LIGO Scientific Collaboration, Virgo Collaboration.
Physical Review X 11 (2021) 021053. arXiv:2010.14527 [gr-qc].

5. *Population Properties of Compact Objects from the Second LIGO-Virgo Gravitational-Wave Transient Catalog.*
LIGO Scientific Collaboration, Virgo Collaboration.
[Astrophysical Journal Letters](#) **913** (2021) L7. arXiv:2010.14533 [astro-ph.HE].
4. *Upper Limits on the Isotropic Gravitational-Wave Background from Advanced LIGO's and Advanced Virgo's Third Observing Run.*
LIGO Scientific Collaboration, Virgo Collaboration, KAGRA collaboration.
[Physical Review D](#) **104** (2021) 022004. arXiv:2101.12130 [gr-qc].
3. *Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo .*
LIGO Scientific Collaboration, Virgo Collaboration.
[Astrophysical Journal](#) **882** (2019) L24. arXiv:1811.12940 [astro-ph.HE].
2. *Properties and astrophysical implications of the 150 Msun binary black hole merger GW190521.*
LIGO Scientific Collaboration, Virgo Collaboration.
[Astrophysical Journal Letters](#) **900** (2020) L13. arXiv:2009.01190 [astro-ph.HE].
1. *GW190521: A Binary Black Hole Merger with a Total Mass of 150 M_{\odot} .*
LIGO Scientific Collaboration, Virgo Collaboration.
[Physical Review Letters](#) **125** (2020) 101102. arXiv:2009.01075 [gr-qc].

Other publications:

2. *LISA - Laser Interferometer Space Antenna - Definition Study Report.*
The European Space Agency.
[ESA-SCI-DIR-RP-002](#).
1. *Topics in Bayesian population inference for gravitational wave astronomy.*
R. Buscicchio.
[PhD thesis](#).

Seminar & Talks

Invited talks marked with *.

Conferences and workshops:

30. *Is your stochastic signal really detectable?*.
XXVI SIGRAV conference on general relativity and gravitation, Univ. of Milano-Bicocca, Milan, Italy, 2025/09/09.
- 29.* *Emergence of Milky Way structure in the first year of LISA data*.
CERN UniGe Gravitational Wave meeting, Geneva, Switzerland, 2025/05/23.
28. *LISA stellar-mass black holes informed by the GWTC-3 population: event rates and parameters reconstruction*.
LISA Astrophysics Working Group Meeting 2024, Garching, Germany, 2024/11/05.
- 27.* *Astrophysics panel session*.
GRASP: Gravity Shape Pisa 2024, Pisa, Italy, 2024/10/24.
- 26.* *Beyond Gauss? A more accurate model for LISA astrophysical noise sources*.
Kavli Institute for Cosmology Seminars, Cambridge, United Kingdom, 2024/10/14.
- 25.* *Beyond Gauss? A more accurate model for LISA astrophysical noise sources*.
Heterogeneous Data and Large Representation Models in Science, Toulouse, France, 2024/10/01.
24. *LISA stellar-mass black holes informed by the GWTC-3 population: event rates and parameters reconstruction*.
15th International LISA Symposium, Dublin, Ireland, 2024/07/08.
- 23.* *LISA data analysis: from the stochastic background to the Milky Way*.
11th LISA Cosmology Working Group Workshop, Porto, Portugal, 2024/06/19.
- 22.* *An introduction to Bayesian Inference*.
International Pulsar Timing Array Student Week, Milan, Italy, 2024/06/17.
- 21.* *Statistical challenges in LISA data analysis*.
LAUTARO joint meeting, GSSI-University of Milano-Bicocca, Milano, Italy, 2024/04/17.
20. *From mHz to kHz: stochastic background implications on astrophysical sources and population reconstruction*.
LISA Astrophysics working group workshop, University of Milano-Bicocca, Milano, Italy, 2023/09/13.
19. *Non-gaussian gravitational wave backgrounds across the GW spectrum*.
XXV Sigrav conference on general relativity and gravitation, SISSA, Trieste, Italy, 2023/09/04.
- 18.* *LISA SGWB data analysis (session chair)*.
Data Analysis Challenges for SGWB Workshop, CERN, Geneva, Switzerland, 2023/07/19.
- 17.* *Global Fit and foregrounds*.
LISA SGWB detection brainstorming, Univ. of Geneva, Geneva, Switzerland, 2023/07/17.
- 16.* *Beyond functional forms: non-parametric methods. (panelist talk)*.
Gravitational-wave populations: What's next?, University of Milano-Bicocca, Milan, Italy, 2023/07/01.
15. *The last three years : multiband gravitational-wave observations of stellar-mass binary black holes*.
LISA Astrophysics working group workshop, University of Birmingham, Birmingham, UK, 2022/06/23.
14. *The last three years : multiband gravitational-wave observations of stellar-mass binary black holes*.
American Physical Society (APS) April meeting, New York (NY), USA, 2022/04/12.
13. *Bayesian parameter estimation of stellar-mass black-hole binaries with LISA*.
XXIV Sigrav conference on general relativity and gravitation, Urbino, Italy, 2021/09/08.
12. *Chirp: a web and smartphone application for visualization of gravitational-wave alerts*.
14th Amaldi Conference on Gravitational Waves, (online), 2021/07/21.
- 11.* *Search for lensing signatures in the gravitational-wave observations from the first half of LIGO-Virgo's third observing run*.
2nd EPS conference on gravitation, (online, on behalf of LVK), 2021/05/27.
- 10.* *Bayesian parameter estimation of stellar-mass black-hole binaries with LISA*.
LISA Data Challenge meeting, (online), 2021/06/17.
- 9.* *Search for lensing signatures in the gravitational-wave observations from the first half of LIGO-Virgo's third observing run*.
Webinar on behalf of the LVK collaboration, (online), 2021/05/27.
8. *Milky Way Satellites Shining Bright in Gravitational Waves*.
13th LISA Symposium, (online), 2020/09/13.
7. *Constraining the Lensing of Binary Black Holes from Their Stochastic Background*.
LISA Sprint workshop, CCA, Flatiron Institute, New York (NY), USA, 2020/03/04.
6. *Multiple source detection in GW astronomy: the label switching problem*.
30th Texas Symposium, University of Portsmouth, Portsmouth, UK, 2019/12/12.
5. *Non-gaussian Stochastic background search with importance sampling*.
LIGO, Virgo, KAGRA September meeting, Warsaw, Poland, 2019/09/01.

4. An improved detector for non-Gaussian stochastic background.
Stochastic Background Data Analysis for LISA meeting, Instituto de Fisica Teorica, Madrid, Spain, 2019/06/01.
3. Hierarchical nonparametric density estimation for population inference.
LIGO, Virgo, KAGRA March meeting, Wisconsin, USA, 2019/03/18.
2. Fast Evaluation of Campbell processes N-point correlation functions.
Astro Hack Week: Data Science for Next-Generation Astronomy, Lorentz Center, Leiden, The Netherlands, 2018/08/01.
1. Stochastic Gravitational Wave Background Data Analysis for Radler.
5th LISA Cosmology Working Group workshop, Physicum, University of Helsinki, Helsinki, Finland, 2018/06/01.

Seminars:

- 10.* Fast LISA inference using Gaussian processes.
University of Geneva, Geneva, Switzerland, 2025/05/21.
- 9.* Emergence of Milky Way structure in the first year of LISA data.
Department of Physics, University of Pisa, Pisa, Italy, 2025/05/16.
- 8.* Statistical challenges in GW inference: an application of field theory to direct population reconstruction in LISA.
APP seminar, SISSA, Trieste, Italy, 2024/05/06.
- 7.* GRAF: Gravitational waves data and global fit.
Department of Physics, University of Milano-Bicocca, Milan, Italy, 2023/12/14.
- 6.* LISA global inference: statistical and modelling challenges for the Milky Way.
Max Planck Institute for Astrophysics, Garching, Germany, 2023/11/29.
- 5.* LISA Global inference: modelling, statistical, and computational challenges.
Department of Physics, University of Pisa, Pisa, Italy, 2023/10/04.
- 4.* Gravitational waves in the many sources, many detectors era.
Institute for Mathematics and Physics, University of Stavanger, Stavanger, Norway, 2022/09/29.
- 3.* Stellar mass binary black holes : what, when, and where.
Astroparticule et cosmologie, Université Paris Citè, Paris, France, 2022/06/12, (online).
- 2.* The last three years: multiband gravitational-wave observations of stellar-mass binary black holes.
Physics Department, Columbia University, New York (NY), USA, 2022/04/07.
- 1.* Set the alarm : Bayesian parameter estimation of stellar-mass black-hole binaries with LISA.
Sun Yat-sen University, Zhuhai, China, 2021/07/30, (online).

Outreach:

5. Onde gravitazionali: ascoltare l'Universo anzich'e solo guardarla.
University of Milano-Bicocca, Milan, Italy, 2024.
4. An orchestra of lasers and gravitational waves.
Pint of Science 2024, Milan, Italy, 2024.
3. Gravitational-waves in space and on Earth.
Manchester Museum of Science and Industry, Manchester, UK, 2018.
2. An orchestra of lasers and gravitational waves.
Manchester Museum of Science and Industry, Manchester, UK, 2018.
1. A Universe of waves.
Science Caf'e, Italy, 2018.

Date: December 13, 2025