

Fabian Gittins

CONTACT INFORMATION	Department of Physics and Astronomy The Johns Hopkins University, 3400 N. Charles Street Baltimore, MD 21218, United States	fgittin1@jh.edu fgittins.github.io
CITIZENSHIP	United Kingdom	
RESEARCH INTERESTS	Relativistic astrophysics – Gravitational-wave astronomy – Extreme physics of neutron stars One major theme is building predictive, physically faithful neutron-star models with realistic microphysics and dynamics. Second major theme is using gravitational waves to extract this physics and constrain dense nuclear matter. Currently, advancing gravitational-wave asteroseismology to probe dense matter through modelling and detection of neutron-star oscillation modes.	
EDUCATION	PhD, Mathematics , University of Southampton, GB Advisor: Prof Nils Andersson Thesis title: <i>Gravitational waves from deformed neutron stars: mountains and tides</i> MSci, Physics , University of Birmingham, GB Grade: First class honours Undergraduate Master's degree with focus on theoretical physics	Sep 2021 Jul 2017
RESEARCH POSITIONS	Marie Skłodowska-Curie Fellow , Johns Hopkins University, US Marie Skłodowska-Curie Fellow , Utrecht University, NL Research Fellow , University of Southampton, GB PhD Researcher , University of Southampton, GB	Oct 2026–Present Oct 2024–Sep 2026 Oct 2021–Sep 2024 Sep 2017–Sep 2021
HONOURS AND AWARDS	Marie Skłodowska-Curie Postdoctoral Fellowship (Global) , EU Project lead of <i>QuarkWave</i> ; €454,103 Marie Skłodowska-Curie Postdoctoral Fellowship (European) , EU Project lead of <i>DynTideEOS</i> ; €203,464 Gravitational Physics Thesis Prize , Institute of Physics, GB Best Publication in Gravitational Physics , University of Southampton, GB Physics Scholarship , University of Birmingham, GB	Oct 2026–Sep 2029 Oct 2024–Sep 2026 2021 2021 2013

PUBLICATION
SUMMARY

Full list of publications can be found on [Google Scholar](#), [INSPIRE-HEP](#) and [NASA ADS](#).

h-index—16 (according to Google Scholar) or 14 (according to INSPIRE-HEP). Both include collaboration papers.

Top five cited—Excluding long-author-list papers. Citation counts according to Google Scholar.

1. **Gittins, F.**, Andersson, N., Jones, D. I., *Modelling neutron star mountains*, [Mon. Not. R. Astron. Soc. **500**, 5570 \(2021\)](#) [[arXiv:2009.12794](#)]. (83 citations)
2. **Gittins, F.**, Andersson, N., *Modelling neutron star mountains in relativity*, [Mon. Not. R. Astron. Soc. **507**, 116 \(2021\)](#) [[arXiv:2105.06493](#)]. (75 citations)
3. **Gittins, F.**, Andersson, N., Pereira, J. P., *Tidal deformations of neutron stars with elastic crusts*, [Phys. Rev. D **101**, 103025 \(2020\)](#) [[arXiv:2003.05449](#)]. (52 citations)
4. Pereira, J. P., Bejger, M., Andersson, N., **Gittins, F.**, *Tidal deformations of hybrid stars with sharp phase transitions and elastic crusts*, [Astrophys. J. **895**, 28 \(2020\)](#) [[arXiv:2003.10781](#)]. (44 citations)
5. **Gittins, F.**, *Gravitational waves from neutron-star mountains*, [Class. Quantum Gravity **41**, 043001 \(2024\)](#) [[arXiv:2401.01670](#)]. (37 citations)

COLLABORATION
PUBLICATIONS

Since 2026, I have been a co-author of refereed LIGO-Virgo-KAGRA and Einstein Telescope Collaboration publications. I list only non-collaboration articles below.

SUBMITTED
PUBLICATIONS

- [29] Wouters, T., Ng, T. C. K., Koehn, H., **Gittins, F.**, (3 more authors), *Scalable and sequential inference of the neutron star equation of state with the Einstein Telescope* [[arXiv:2610.07975](#)] (submitted to Phys. Rev. Lett.).
- [28] Yu, H., (6 authors), **Gittins, F.**, Nanda, A., *Nonlinear hydrodynamics in spinning neutron stars: Theoretical universal relations and equilibrium solutions* [[arXiv:2607.07943](#)] (submitted to Phys. Rev. D).
- [27] Negri, L., (8 authors), **Gittins, F.**, (6 more authors), *Impact of the Einstein Telescope's duty cycle on the estimation of binary black holes parameters* [[arXiv:2606.19201](#)] (submitted to Phys. Rev. D).

ACCEPTED
PUBLICATIONS

- [26] **Gittins, F.**, Narola, H., Wouters, T., Pang, P. T. H., Hinderer, T., Van Den Broeck, C., *Detecting tidal resonances in binary neutron stars*, [Phys. Rev. Lett.](#) [[arXiv:2606.06376](#)].

REFEREED
PUBLICATIONS**Research articles**

- [25] Andersson, N., Counsell, A. R., **Gittins, F.**, Ghosh, S., *Tidal response of a relativistic star*, [Phys. Rev. D **113**, 064051 \(2026\)](#) [[arXiv:2511.05139](#)].
- [24] Yin, S., Andersson, N., **Gittins, F.**, *A post-Newtonian approach to neutron star oscillations*, [Class. Quantum Gravity **42**, 235002 \(2025\)](#) [[arXiv:2504.06918](#)].
- [23] Pnigouras, P., Andersson, N., **Gittins, F.**, Counsell, A. R., *Dynamical neutron star tides: the signature of a mode resonance*, [Mon. Not. R. Astron. Soc. **542**, 1375 \(2025\)](#) [[arXiv:2508.06416](#)].

- [22] Counsell, A. R., **Gittins, F.**, Andersson, N., Tews, I., *Interface modes in inspiralling neutron stars: A gravitational-wave probe of first-order phase transitions*, **Phys. Rev. Lett.** **135**, 081402 (2025) [arXiv:2504.06181].
- [21] **Gittins, F.**, Andersson, N., Yin, S., *Perturbation theory for post-Newtonian neutron stars*, **Class. Quantum Gravity** **42**, 135014 (2025) [arXiv:2503.03345].
- [20] **Gittins, F.**, Andersson, N., *Neutron-star seismology with realistic, finite-temperature nuclear matter*, **Phys. Rev. D** **111**, 083024 (2025) [arXiv:2406.05177].
- [19] **Gittins, F.**, Matur, R., Andersson, N., Hawke, I., *Problematic systematics in neutron-star merger simulations*, **Phys. Rev. D** **111**, 023049 (2025) [arXiv:2409.13468].
- [18] Counsell, A. R., **Gittins, F.**, Andersson, N., Pnigouras, P., *Neutron star g modes in the relativistic Cowling approximation*, **Mon. Not. R. Astron. Soc.** **536**, 1967 (2025) [arXiv:2409.20178].
- [17] Counsell, A. R., **Gittins, F.**, Andersson, N., *The impact of nuclear reactions on the neutron-star g-mode spectrum*, **Mon. Not. R. Astron. Soc.** **531**, 1721 (2024) [arXiv:2310.13586].
- [16] Pnigouras, P., **Gittins, F.**, Nanda, A., Andersson, N., Jones, D. I., *The dynamical tides of spinning Newtonian stars*, **Mon. Not. R. Astron. Soc.** **527**, 8409 (2024) [arXiv:2205.07577].
- [15] Beri, A., (5 authors), **Gittins, F.**, Celora, T., *AstroSat and NuSTAR observations of XTE J1739-285 during the 2019-2020 outburst*, **Mon. Not. R. Astron. Soc.** **521**, 5904 (2023) [arXiv:2303.13085].
- [14] **Gittins, F.**, Celora, T., Beri, A., Andersson, N., *Modelling neutron-star ocean dynamics*, **Universe** **9**, 226 (2023) [arXiv:2304.05413].
- [13] **Gittins, F.**, Andersson, N., *The r-modes of slowly rotating, stratified neutron stars*, **Mon. Not. R. Astron. Soc.** **521**, 3043 (2023) [arXiv:2212.04892].
- [12] Andersson, N., **Gittins, F.**, *Formulating the r-mode problem for slowly rotating neutron stars*, **Astrophys. J.** **945**, 139 (2023) [arXiv:2212.04837].
- [11] Andersson, N., **Gittins, F.**, Yin, S., Panosso Macedo, R., *Building post-Newtonian neutron stars*, **Class. Quantum Gravity** **40**, 025016 (2023) [arXiv:2209.05871].
- [10] Riley, J., (6 authors), **Gittins, F.**, (16 more authors), *Rapid stellar and binary population synthesis with COMPAS*, **Astrophys. J. Suppl. Ser.** **258**, 34 (2022) [arXiv:2109.10352].
- [9] **Gittins, F.**, Andersson, N., *Modelling neutron star mountains in relativity*, **Mon. Not. R. Astron. Soc.** **507**, 116 (2021) [arXiv:2105.06493].
- [8] **Gittins, F.**, Andersson, N., Jones, D. I., *Modelling neutron star mountains*, **Mon. Not. R. Astron. Soc.** **500**, 5570 (2021) [arXiv:2009.12794].
- [7] **Gittins, F.**, Andersson, N., Pereira, J. P., *Tidal deformations of neutron stars with elastic crusts*, **Phys. Rev. D** **101**, 103025 (2020) [arXiv:2003.05449].
- [6] Pereira, J. P., Bejger, M., Andersson, N., **Gittins, F.**, *Tidal deformations of hybrid stars with sharp phase transitions and elastic crusts*, **Astrophys. J.** **895**, 28 (2020) [arXiv:2003.10781].
- [5] **Gittins, F.**, Andersson, N., *Population synthesis of accreting neutron stars emitting gravitational waves*, **Mon. Not. R. Astron. Soc.** **488**, 99 (2019) [arXiv:1811.00550].

Review articles

- [4] **Gittins, F.**, *Gravitational waves from neutron-star mountains*, **Class. Quantum Gravity** **41**, 043001 (2024) [arXiv:2401.01670].

Software articles

- [3] Riley, J., (6 authors), **Gittins, F.**, (16 more authors), *COMPAS: A rapid binary population synthesis suite*, *J. Open Source Softw.* **7**, 3838 (2022).

Conference proceedings

- [2] Thomas, A. Stevenson, E., **Gittins, F.**, (5 authors), *Galactic archaeology with TESS: Prospects for testing the star formation history in the solar neighbourhood*, *EPJ Web Conf.* **160**, 05006 (2017) [[arXiv:1610.08862](#)].

WHITE PAPERS

- [1] Dietrich, T., (19 authors), **Gittins, F.**, (22 more authors), *ESO Expanding Horizon White Paper: Revealing the properties of matter at supranuclear densities with gravitational waves* [[arXiv:2512.16971](#)].

INVITED TALKS

- | | |
|--|--------------------|
| 14. <i>Physics Colloquium</i> | 7 Oct 2026 |
| University of Maryland, Baltimore County, Cantonsville, US | |
| 13. <i>Astrophysics Talks Series</i> | 2 Apr 2026 |
| Istanbul University Observatory, TR (online) | |
| 12. <i>International Research Network for Nuclear Astrophysics Seminar</i> | 16 Jan 2026 |
| (online) | |
| 11. <i>CoCoNuT Meeting 2025</i> | 28 Oct 2025 |
| University of Strasbourg, FR | |
| 10. <i>High Energy Particle Physics and Cosmology Theory Seminar</i> | 30 Sep 2025 |
| Johns Hopkins University, Baltimore, US | |
| 9. <i>Institute for Nuclear Theory Program 25-2b</i> | 17 Sep 2025 |
| University of Washington, Seattle, US | |
| 8. <i>Gravitational Wave Meeting</i> | 18 Jun 2025 |
| National Institute for Subatomic Physics, NL (online) | |
| 7. <i>Astrophysics Seminar</i> | 30 May 2024 |
| Mullard Space Science Laboratory, University College London, GB | |
| 6. <i>Gravitational Wave Group</i> | 14 Dec 2023 |
| Institute of Cosmology and Gravitation, University of Portsmouth, GB | |
| 5. <i>SPINS-UK Seminar</i> | 7 Jun 2023 |
| (online) | |
| 4. <i>Symposium on Gravitational Wave Physics and Astronomy: Genesis</i> | 28 Apr 2022 |
| Kyoto University, JP (online) | |
| 3. <i>22nd BritGrav Conference</i> | 5 Apr 2022 |
| University of Glasgow, GB (online) | |
| 2. <i>Colloquium</i> | 6 Oct 2020 |
| Albert Einstein Institute, Hannover, DE (online) | |
| 1. <i>LIGO-Virgo Collaboration Continuous Waves Working Group</i> | 5 Dec 2018 |
| (online) | |

CONTRIBUTED TALKS (SELECTED)	27 contributed talks at 25 separate conferences and meetings, including:	
	10. <i>NNV section for (astro)particle physics fall meeting</i>	7 Nov 2025
	Soesterberg, NL	
	9. <i>Joint 24th International Conference on General Relativity and Gravitation and 16th Edoardo Amaldi Conference on Gravitational Waves</i> , Glasgow, GB	17 Jul 2025
	8. <i>XV Einstein Telescope Symposium</i>	27 May 2025
	Bologna, IT	
	7. <i>Institute for Nuclear Theory Workshop 24-89w</i>	5 Sep 2024
	University of Washington, Seattle, US	
	6. <i>XIV Einstein Telescope Symposium</i>	6–7 May 2024
	Maastricht, NL	
TEACHING EXPERIENCE	5. <i>SPINS-UK 2023 meeting</i>	23 Nov 2023
	Magdalen College, University of Oxford, GB	
	4. <i>Institute for Nuclear Theory Program 22-2a</i>	18 Jul 2022
	University of Washington, Seattle, US	
	3. <i>PHAROS Conference 2022</i>	18 May 2022
	La Sapienza University, Rome, IT	
	2. <i>30th Texas Symposium on Relativistic Astrophysics</i>	17 Dec 2019
	University of Portsmouth, GB	
	1. <i>Joint 22nd International Conference on General Relativity and Gravitation and 13th Edoardo Amaldi Conference on Gravitational Waves</i> , Valencia, ES	9 Jul 2019
	Lecturer , Utrecht University, NL	Apr–Jul 2026
	NS-378B, Cosmology	
	Third-year BSc course with ~ 70 students; mean student evaluation score of 7.6/10	
	Instructor , University of Southampton, GB	Feb–May 2024
	MATH1007/1009, Mathematical Methods for Physical Scientists	
	First-year BSc course with ~ 30 students	
	Guest Lecturer , University of Southampton, GB	
	MATH3072, Advanced Fluid Dynamics	Oct 2022, Oct 2023
	Third-year BSc course with ~ 20 students	
	MATH3006, Relativity, Black Holes and Cosmology	Apr 2022
	Third-year BSc course with ~ 30 students	
	Teaching Assistant , University of Southampton, GB	Oct 2017–May 2021
	MATH1054/1055, Mathematics for Engineering and the Environment	
	MATH1057, Dynamics and Relativity	
	MATH1058, Operational Research I and Mathematical Computing	
	MATH2045, Vector Calculus and Complex Variable Theory	
	MATH3018, Numerical Methods	

MATH3087, Maths and Your Future

Teaching Assistant, King Edward's School, Birmingham, GB
Physics (11–16 yr)

Jan–Apr 2016

**MENTORING AND
SUPERVISION**

PhD student mentoring

Vincent Ernst, Université Catholique de Louvain, BE

Sep 2025–Present

Thibaut Wouters, Utrecht University, NL

Oct 2024–Present

Rahime Matur, University of Southampton, GB

Jan 2023–Sep 2024

Rhys Counsell, University of Southampton, GB

Sep 2021–Sep 2024

Shanshan Yin, University of Southampton, GB

Sep 2021–Sep 2024

Thomas Celora, University of Southampton, GB

Sep 2021–Sep 2023

BSc student mentoring

Anouk Verburg, Utrecht University, NL

Aug 2026–Present

Tobie Walraven, Utrecht University, NL

Aug 2025–Jan 2026

**SCIENTIFIC
COLLABORATIONS**

Virgo Collaboration, Member

Oct 2024–Present

Cosmic Explorer Consortium, Member

May 2024–Present

Einstein Telescope Collaboration, Member

Sep 2023–Present

**LEADERSHIP AND
ACADEMIC
CITIZENSHIP**

International Astronomical Union, Junior member

May 2023–Present

International Society on General Relativity and Gravitation,

May 2021–Present

Lifetime member

European Astronomical Society, Member

Nov 2024–Dec 2025

Royal Astronomical Society, Fellow

Jul 2021–Dec 2025

Institute of Physics, Member

Apr 2021–Dec 2025

Gravitational Physics Group, Committee member

Oct 2021–Sep 2025

Conference organiser

SPINS-UK 2024 meeting, University of Southampton, GB

10–12 Sep 2024

Local organising committee, ~ 40 participants

Continuous gravitational waves and neutron stars workshop,

17–20 Jun 2024

Albert Einstein Institute, Hannover, DE

Scientific organising committee, ~ 50 participants

Gravitational Physics Annual Meeting, Institute of Physics, GB

18 Jan 2024

Scientific organising committee, ~ 50 participants

23rd BritGrav Conference, University of Southampton, GB

13–14 Apr 2023

Scientific and local organising committee, ~ 100 participants

Seminar organiser

Gravity Seminar, University of Southampton, GB

Oct 2021–Sep 2024

Weekly Gravity Reading Group, University of Southampton, GB

Jan–Jul 2021**Panellist***Fellowships Panel Discussion, GW:UK* (online)**26 Jun 2026**

Funding Opportunities Workshop,

27 May 2026*Gravitational-Wave Early Career Scientists* (online)**PROFESSIONAL
SERVICE****Journal referee**

Astronomy and Astrophysics, Classical and Quantum Gravity, Journal of Cosmology and
Astroparticle Physics, Journal of Physics G, Monthly Notices of the Royal Astronomical Society,
Nature Astronomy, Physical Review (D, Letters), The Astrophysical Journal

Project referee

UNamur Postdoctoral Programme, University of Namur, BE

2025*Open Fellowship*, Engineering and Physical Sciences Research Council, GB**2024****PUBLIC
ENGAGEMENT****Outreach activities***Southampton Science and Engineering Festival***7 May 2022, 18 Mar 2023**

Organised neutron-star exhibit for general public and coordinated team of 10 volunteers

Mathematical Challenge

Mar–Apr 2020

Marked over 200 pupil entries

Maths and Physics Workshop

8 Nov 2017Demonstrated for ~ 100 secondary-school pupils**Press (selected)**

Lightest neutron star ever found could contain compressed quarks,
New Scientist

24 Oct 2022

*Neutron star ‘mountains’ may be blocking our view of mysterious
gravitational waves,* Live Science

21 Jul 2021

*Mountains on neutron stars are not even a millimetre tall due to extreme
gravity,* The Register

21 Jul 2021

*Scientists find tiny mountains on neutron stars that are a fraction of a
millimetre tall,* The Independent

19 Jul 2021

Neutron Stars Have Mountains That Are Less Than a Millimeter Tall,
Gizmodo

18 Jul 2021

Neutron stars are remarkably smooth thanks to their intense gravity,
New Scientist

24 May 2021*Why don’t they just break up?* Astrobites**16 Nov 2018**

COMPUTER SKILLS Advanced in Julia, Python. Intermediate in Bash, C++, Mathematica, MATLAB. Intermediate in high-performance computing (HTCondor, Slurm). Markup languages: $\text{\LaTeX}$, Markdown.

Software—Most contributions can be found at <https://github.com/fgittins>. Member of the *Bilby* development team (<https://github.com/bilby-dev/bilby>). Contributor to *SciML* (<https://sciml.ai>), in particular NonlinearSolve.jl (<https://github.com/SciML/NonlinearSolve.jl>). Author of RealisticSeismology Julia code (<https://github.com/fgittins/RealisticSeismology>).

REFERENCES

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The Netherlands

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