

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., <i>Modelling neutron star mountains</i>, Mon. Not. R. Astron. Soc. 500, 5570 (2021) [arXiv:2009.12794]. (83 citations) 2. Gittins, F., Andersson, N., <i>Modelling neutron star mountains in relativity</i>, Mon. Not. R. Astron. Soc. 507, 116 (2021) [arXiv:2105.06493]. (75 citations) 3. Gittins, F., Andersson, N., Pereira, J. P., <i>Tidal deformations of neutron stars with elastic crusts</i>, Phys. Rev. D 101, 103025 (2020) [arXiv:2003.05449]. (52 citations) 4. Pereira, J. P., Bejger, M., Andersson, N., Gittins, F., <i>Tidal deformations of hybrid stars with sharp phase transitions and elastic crusts</i>, Astrophys. J. 895, 28 (2020) [arXiv:2003.10781]. (44 citations) 5. Gittins, F., <i>Gravitational waves from neutron-star mountains</i>, 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	[28] Yu, H. et al., <i>Nonlinear hydrodynamics in spinning neutron stars: Theoretical universal relations and equilibrium solutions</i> [arXiv:2607.07943] (submitted to Phys. Rev. D). [27] Negri, L. et al., <i>Impact of the Einstein Telescope’s duty cycle on the estimation of binary black holes parameters</i> [arXiv:2606.19201] (submitted to Phys. Rev. D).
ACCEPTED PUBLICATIONS	[26] Gittins, F. et al., <i>Detecting tidal resonances in binary neutron stars</i>, Phys. Rev. Lett. [arXiv:2606.06376].
REFEREED PUBLICATIONS	Research articles [25] Andersson, N., Counsell, A. R., Gittins, F., Ghosh, S., <i>Tidal response of a relativistic star</i>, Phys. Rev. D 113, 064051 (2026) [arXiv:2511.05139]. [24] Yin, S., Andersson, N., Gittins, F., <i>A post-Newtonian approach to neutron star oscillations</i>, Class. Quantum Gravity 42, 235002 (2025) [arXiv:2504.06918]. [23] Pnigouras, P., Andersson, N., Gittins, F., Counsell, A. R., <i>Dynamical neutron star tides: the signature of a mode resonance</i>, Mon. Not. R. Astron. Soc. 542, 1375 (2025) [arXiv:2508.06416]. [22] Counsell, A. R., Gittins, F. et al., <i>Interface modes in inspiralling neutron stars: A gravitational-wave probe of first-order phase transitions</i>, Phys. Rev. Lett. 135, 081402 (2025) [arXiv:2504.06181]. [21] Gittins, F., Andersson, N., Yin, S., <i>Perturbation theory for post-Newtonian neutron stars</i>, Class. Quantum Gravity 42, 135014 (2025) [arXiv:2503.03345]. [20] Gittins, F., Andersson, N., <i>Neutron-star seismology with realistic, finite-temperature nuclear matter</i>, Phys. Rev. D 111, 083024 (2025) [arXiv:2406.05177].

- [19] **Gittins, F.** et al., *Problematic systematics in neutron-star merger simulations*, *Phys. Rev. D* **111**, 023049 (2025) [arXiv:2409.13468].
- [18] Counsell, A. R., **Gittins, F.** et al., *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.** et al., *The dynamical tides of spinning Newtonian stars*, *Mon. Not. R. Astron. Soc.* **527**, 8409 (2024) [arXiv:2205.07577].
- [15] Beri, A. et al., *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.** et al., *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.** et al., *Building post-Newtonian neutron stars*, *Class. Quantum Gravity* **40**, 025016 (2023) [arXiv:2209.05871].
- [10] Riley, J. et al., *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. et al., *COMPAS: A rapid binary population synthesis suite*, *J. Open Source Softw.* **7**, 3838 (2022).

Conference proceedings

- [2] Thomas, A. Stevenson, E., **Gittins, F.** et al., *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. et al., <i>ESO Expanding Horizon White Paper: Revealing the properties of matter at supranuclear densities with gravitational waves</i> [arXiv:2512.16971].	
INVITED TALKS	13. <i>Astrophysics Talks Series</i> , Istanbul University Observatory, TR (online)	2 Apr 2026
	12. <i>International Research Network for Nuclear Astrophysics Seminar</i> (online)	16 Jan 2026
	11. <i>CoCoNuT Meeting 2025</i> , University of Strasbourg, FR	28 Oct 2025
	10. <i>High Energy Particle Physics and Cosmology Theory Seminar</i> , Johns Hopkins University, Baltimore, US	30 Sep 2025
	9. <i>Institute for Nuclear Theory Program 25-2b</i> , University of Washington, Seattle, US	17 Sep 2025
	8. <i>Gravitational Wave Meeting</i> , National Institute for Subatomic Physics, NL (online)	18 Jun 2025
	7. <i>Astrophysics Seminar</i> , Mullard Space Science Laboratory, University College London, GB	30 May 2024
	6. <i>Gravitational Wave Group</i> , Institute of Cosmology and Gravitation, University of Portsmouth, GB	14 Dec 2023
	5. <i>SPINS-UK Seminar</i> (online)	7 Jun 2023
	4. <i>Symposium on Gravitational Wave Physics and Astronomy: Genesis</i> , Kyoto University, JP (online)	28 Apr 2022
	3. <i>22nd BritGrav Conference</i> , University of Glasgow, GB (online)	5 Apr 2022
	2. <i>Colloquium</i> , Albert Einstein Institute, Hannover, DE (online)	6 Oct 2020
	1. <i>LIGO-Virgo Collaboration Continuous Waves Working Group</i> (online)	5 Dec 2018
CONTRIBUTED TALKS (SELECTED)	27 contributed talks at 25 separate conferences and meetings, including:	
	10. <i>NNV section for (astro)particle physics fall meeting</i> , Soesterberg, NL	7 Nov 2025
	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> , Bologna, IT	27 May 2025
	7. <i>Institute for Nuclear Theory Workshop 24-89w</i> , University of Washington, Seattle, US	5 Sep 2024
	6. <i>XIV Einstein Telescope Symposium</i> , Maastricht, NL	6–7 May 2024
	5. <i>SPINS-UK 2023 meeting</i> , Magdalen College, University of Oxford, GB	23 Nov 2023
	4. <i>Institute for Nuclear Theory Program 22-2a</i> , University of Washington, Seattle, US	18 Jul 2022
	3. <i>PHAROS Conference 2022</i> , La Sapienza University, Rome, IT	18 May 2022
	2. <i>30th Texas Symposium on Relativistic Astrophysics</i> , University of Portsmouth, GB	17 Dec 2019
	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

TEACHING
EXPERIENCE

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	Jan–Apr 2016
Physics (11–16 yr)	

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, Lifetime member	May 2021–Present
	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 Local organising committee, ~ 40 participants	10–12 Sep 2024
	Continuous gravitational waves and neutron stars workshop, Albert Einstein Institute, Hannover, DE Scientific organising committee, ~ 50 participants	17–20 Jun 2024
	Gravitational Physics Annual Meeting, Institute of Physics, GB Scientific organising committee, ~ 50 participants	18 Jan 2024
	23rd BritGrav Conference, University of Southampton, GB Scientific and local organising committee, ~ 100 participants	13–14 Apr 2023
	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, Gravitational-Wave Early Career Scientists (online)	27 May 2026
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 2017
Demonstrated for ~ 100 secondary-school pupils	

Press (selected)

<i>Lightest neutron star ever found could contain compressed quarks,</i> New Scientist	24 Oct 2022
<i>Neutron star ‘mountains’ may be blocking our view of mysterious gravitational waves,</i> Live Science	21 Jul 2021
<i>Mountains on neutron stars are not even a millimetre tall due to extreme gravity,</i> The Register	21 Jul 2021
<i>Scientists find tiny mountains on neutron stars that are a fraction of a millimetre tall,</i> The Independent	19 Jul 2021
<i>Neutron Stars Have Mountains That Are Less Than a Millimeter Tall,</i> Gizmodo	18 Jul 2021
<i>Neutron stars are remarkably smooth thanks to their intense gravity,</i> New Scientist	24 May 2021
<i>Why don’t they just break up?</i> 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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