

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 more 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>
University of Maryland, Baltimore County, US | 7 Oct 2026 |
| 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, US | 30 Sep 2025 |
| 9. <i>Institute for Nuclear Theory Program 25-2b</i>
University of Washington, 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>	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, 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, 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**

LIGO-Virgo-KAGRA Collaboration, Member

Oct 2024–Present

LIGO Collaboration, Member

Oct 2026–Present

Virgo Collaboration, Member

Oct 2024–Sep 2026

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

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, Physical Review 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)

Lightest neutron star ever found could contain compressed quarks, **24 Oct 2022**
 New Scientist
*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, **18 Jul 2021**
 Gizmodo
Neutron stars are remarkably smooth thanks to their intense gravity, **24 May 2021**
 New Scientist

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

Prof Nils Andersson, Professor of Applied Mathematics

School of Mathematical Sciences

University of Southampton

University Road

Southampton, SO17 1BJ

United Kingdom

email: n.a.andersson@southampton.ac.uk

office phone: +44 23 8059 4551

Prof Chris Van Den Broeck, Professor of Physics

Institute for Gravitational and Subatomic Physics

Utrecht University

Princetonplein 1

3584 CC Utrecht

The Netherlands

email: c.f.f.vandenbroeck@uu.nl

office phone: +31 6 25 133 968

Dr David Tsang, Senior Lecturer in Physics

Department of Physics

University of Bath

Claverton Down

Bath, BA2 7AY

United Kingdom

email: d.tsang@bath.ac.uk

office phone: +44 12 2538 4539