# CHRISTOPHER WHITTALL

c.l.whittall@soton.ac.uk, christopherwhittall.com

---

## EDUCATION

**2020 – Sep 2024 (expected): University of Southampton:** PhD in Mathematical Sciences

- Project title: *Frequency-domain approach to self-force in hyperbolic scattering*
- Supervisor: Leor Barack
- Project: developing frequency-domain techniques for calculating the self-force in hyperbolic black hole scatter events.
- Teaching: undergraduate computer labs; face-to-face marking and teaching mathematical methods to first year undergraduate engineers; marking undergraduate problem sheets.

**2019 – 2020: University of Cambridge:** MMath in Mathematics

- 92% in final examination. Pass with Honours*
- Courses including: General Relativity, Black Holes, Cosmology and Quantum Field Theory.
- Essay project reviewing spontaneous scalarisation of neutron stars in scalar-tensor theories of gravity, and the resulting smoking gun gravitational wave signatures.

* Please note conventional classifications were not awarded due to the onset of the coronavirus pandemic.

**2016 – 2019: University of Cambridge:** BA in Mathematics

- Class I in the 3rd year of the Mathematical Tripos
- Courses covering a wide range of pure and applied mathematics and theoretical physics.
- 145/150 in the 3rd year Computational Projects module.

---

## OTHER RESEARCH EXPERIENCE

**2019: DAMTP, University of Cambridge:** Summer Research Student

- 8 week summer research project under Dr Joseph Keir: numerically investigated the stability of non-linear wave equations obeying the classical null condition on compact manifolds.
- Successful applications for funding from the Faculty of Mathematics and St John's College.

**2018: UK Meteorological Office:** Visiting Scientist

- 8 week project under Malcolm Kitchen at the Met Office: developed and implemented a model of atmospheric refraction of ADS-B radio transmissions from aircraft, and applied this to analyse the sensitivity of angle of arrival information to changes in weather profile.
- Successful application for part-funding from the Faculty of Mathematics.

---

## COMPUTING EXPERIENCE

- Strong command of computing skills, including **Bash** scripting, version control using **Git**, and the use of **high performance computing** resources.

- Highly competent **C** and **C++** programmer, with particular emphasis on numerical calculations, including the use of the **GSL** and **Boost** libraries and parallelisation using **OpenMP**.
- Extensive experience using **Python** and **MATLAB** for numerical calculations and data analysis and visualisation.
- Proficiency with **Mathematica** for symbolic and numerical calculations.
- Demonstrated capability to produce a wide variety of technical documents and presentations using **LaTeX**.

---

## PRIZES AND AWARDS

- STAG prize for best student publication in gravitational physics (2023), *awarded by the STAG Research Centre, University of Southampton.*
- Wright prize (2019, 2020), Ian Hall Year Prize (2019), College prize (2018) and Horne scholarship (2018-20) a*warded by St John's College, Cambridge for examination results.*

---

## PUBLICATIONS

- O. Long. **C. Whittall** and L. Barack, "*Black hole scattering near the transition to plunge: Self-force and resummation of post-Minkowskian theory*", June 2024, arXiv:2406.08363
- **C. Whittall** and L. Barack, "*Frequency-domain approach to self-force in hyperbolic scattering*", Phys. Rev. D **108**, 064017 (2023), arXiv:2305.09724. **Chosen as an Editors' Suggestion in Physical Review D and awarded a 2023 STAG publication prize.**

---

## TALKS AND PRESENTATIONS

- "Self-force scattering in the strong and weak field", Conference talk, 27th Capra Meeting on Radiation Reaction in General Relativity, National University of Singapore, 17th June 2024.
- "Black hole scattering: the self-force approach", Seminar, Centre for Theoretical Physics, Queen Mary University of London, 25th March 2024.
- "Self-force in black hole scattering: a scalar-field toy model", Invited talk, Gravitational Self Force and Scattering Amplitudes, University of Edinburgh, 20th March 2024.
- "Black hole scattering: the self-force approach", Invited talk, QCD Meets Gravity IX, CERN, 14th December 2023.
- "Self-force in hyperbolic black hole scattering", Satellite seminar, Asymmetric Binaries meet Fundamental Astro-Physics, Gran Sasso Science Institute, 20th September 2023.
- "Self-force in hyperbolic scattering: a frequency-domain approach", Conference talk, 26th Capra Meeting on Radiation Reaction in General Relativity, Niels Bohr Institute, 4th July 2023.

- “Self-force in hyperbolic scattering: a frequency-domain approach”, Conference talk (online), 23rd International Conference on General Relativity and Gravitation, Chinese Physical Society, 5th July 2022.
- “Self-force in hyperbolic scattering: a frequency-domain approach”, Conference talk, 25th Capra Meeting on Radiation Reaction in General Relativity, University College Dublin, 22nd June 2022.
- “Frequency domain approach to self-force in hyperbolic scattering”, Conference talk (online), 24th Capra Meeting on Radiation Reaction in General Relativity, Perimeter Institute, 10th June 2021.

---

## OTHER EVENTS ATTENDED

- Gravitational Memory Effects: From Theory to Observation, Queen Mary University of London [attended online], 5th - 9th June 2023.
- From Scattering Amplitudes to Gravitational-Wave Predictions for Compact Binaries, Universität Zürich & ETH Zürich, 4th - 15th July 2022.
- BritGrav21, University College Dublin [attended online], 12th – 16th April 2021.

---

## REFERENCES

Available on request

---

Last updated: 22/06/2024