

# Oliver Francis Long

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## Education

2018 - Present     **PhD in Mathematical Sciences**, University of Southampton

- Project title: Self-force in hyperbolic binary-black hole encounters.
- Supervisor: Prof. Leor Barack
- Project involves the modelling of hyperbolic orbits of binary black holes with back-reaction in the extreme-mass-ratio limit using perturbation theory.

2014 - 2018     **MPhys(Hons) in Physics**, The University of Manchester

- First-class honours with an average of 80.4%.
- Full range of modules covering all areas of physics including Gravitation, Advanced Statistical Physics, The Early Universe, Quantum Field Theory and Electrodynamics.
- Master's project involving using Markov chain Monte Carlo methods on the power spectra of the cosmic microwave background to resolve various tensions in the data by using different cosmological models.

2012 - 2014     **A levels**, Hereford Sixth Form College

- A2 in Physics (A\*), Mathematics (A), Chemistry (A), Biology (A) and AS in Further Mathematics (A).

2007 - 2012     **GCSEs**, Lacon Childe High School

- Nine A\*-B GCSE's including English language and German and level 2 certificates in iMedia Computing and BTEC Sport.

## Employment

2018 - Present     **Teaching Assistant**, University of Southampton

- Running undergraduate problem classes and helping with assessment.

## Computing

- Extensive experience with **Mathematica** including tensor algebra, data analysis and graphics.
- Extensive experience with **C++** including numerical calculation and data analysis.
- Extensive experience with **Python** including data analysis and graphics.
- Extensive experience with **L<sup>A</sup>T<sub>E</sub>X**.
- Contributor of scatter orbits to the KerrGeodesics package of the Black Hole Perturbation Toolkit ([bhptoolkit.org](http://bhptoolkit.org)).

## Publications

- O. Long & L. Barack. Time-domain metric reconstruction for hyperbolic scattering. *Phys. Rev. D*, 104(2), July 2021
- O. Long. Self-force correction to the scatter angle of a scalar charge in Schwarzschild space-time (in preparation)

### Conference presentations

- “Self-force in hyperbolic binary-black-hole encounters”, BritGrav22, University of Glasgow via Zoom, 4th – 5th April 2022.
- “Time-domain metric reconstruction for hyperbolic scattering”, 24th Capra Meeting on Radiation Reaction in General Relativity, Perimeter Institute via Zoom, 7th – 11th June 2021.
- “Towards a self-force calculation of the scatter angle in hyperbolic encounters”, BritGrav21, University College Dublin via Zoom, 12th – 16th April 2021.
- “Towards a self-force calculation of the scatter angle in hyperbolic encounters”, 13th LISA Symposium, 1st – 3rd October 2020.
- “Towards a self-force calculation of the scatter angle in hyperbolic encounters”, 23rd Capra Meeting on Radiation Reaction in General Relativity, University of Texas at Austin via Zoom, 22nd – 26th June 2020.

### Conference posters

- “Time-domain metric reconstruction using the Hertz potential”, 3rd meeting of the GWVerse COST action, Institute for Fundamental Physics of the Universe, International School for Advanced Studies, 13th – 16th January 2020.

### Other events attended

- Advances and Challenges in Computational Relativity Workshop (Online), The Institute for Computational and Experimental Research in Mathematics, Brown University, 14th – 18th September 2020.
- Black Hole Perturbation Toolkit Workshop (Online), Astronomical Institute of the Academy of Sciences of the Czech Republic, 25th – 27th May 2020.
- Kavli RISE Summer School on Gravitational Waves, University of Cambridge, 23rd – 27th September 2019.
- 22nd International Conference on General Relativity and Gravitation and 13th Edoardo Amaldi Conference on Gravitational Waves, Palau de congressos de Valencia, 8th – 12th July 2019.
- 22nd Capra Meeting on Radiation Reaction in General Relativity, Centro Brasileiro de Pesquisas Físicas, 17th – 21st June 2019.
- LISA Waveform Working Group Meeting, Max Planck Institute for Gravitational Physics (Albert Einstein Institute), 13th – 15th May 2019.
- BritGrav19, Durham University, 15th – 16th April 2019.
- Black Hole Perturbation Toolkit Workshop, University College Dublin, 19th – 21st March 2019.

### LISA Consortium

- Full member of the LISA Consortium since October 2018.
- Member of the Waveform Working Group and LISA Early Career Scientists (LECS).
- Current work is part of LISA Science Group’s Work Package 1.2.2.

### References

Available upon request.