

# Curriculum Vitae

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## Summary:

I am a HIMR Research Fellow at Imperial college London within the mathematics department. I have recently finished my PhD in the Relativity and Gravitation group, within the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge, supervised by Mihalis Dafermos.

My research interests are in Mathematical General Relativity. More specifically, I study the scattering map of the linear wave equation on gravitationally collapsing backgrounds, and applications of this to Hawking radiation. I have also recently started researching the compressible Euler equations for fluids surrounded by a vacuum.

## Papers:

- F. Alford, The Scattering Map on Oppenheimer-Snyder Spacetime, 2020, *Ann. Henri Poincaré* 21(6), 2031 – 2092.
- F. Alford, A Rigorous Study of Hawking Radiation on Collapsing Charged Spherically Symmetric Spacetimes (PhD Thesis, University of Cambridge, 2021).
- F. Alford, The Scattering Map on Collapsing Charged Spherically Symmetric Spacetimes (Preprint available on request).
- F. Alford, A Rigorous Study of Hawking Radiation on Collapsing Charged Spherically Symmetric Spacetimes (Preprint available on request).

## Invited Talks:

- GR and Hyperbolic PDE monthly Seminar, Princeton, 19 February 2019.
- Analysis Seminar, Imperial College London, 11 October 2019.
- General Relativity Seminar, University of Cambridge, 7 June, 2019.
- General Relativity Seminar, University of Cambridge, 26 November, 2021.
- London PDEs Seminar, Imperial College London, 10 December 2021.
- Relativity Seminar, University of Oxford, 8 February, 2022.

## Education:

- PhD in Mathematical Relativity, Jesus College, University of Cambridge (2017-2021).
- MMath (Distinction), Part III in Mathematics, Jesus College, University of Cambridge (2016-2017).
- BA (First Class) in Mathematics, Jesus College, University of Cambridge (2013-2016).
- A-levels: A\*s in Mathematics, Further Mathematics, Additional Further Mathematics, Physics, Electronics. A in Chemistry.
- GCSEs: 10 A\*s (including Mathematics, English Language and English Literature), 1 A.

## Awards:

- EPSRC PhD Studentship, Award Number 1936235 (2017-2021).
- RA Watchman Prize in Mathematics at Jesus College, University of Cambridge (2017).
- Keller Prize at Jesus College, University of Cambridge (2017).
- Scholarship at Jesus College, University of Cambridge (2015-2017).
- Sir Harold Spencer Jones Prize in Mathematics at Jesus College, University of Cambridge (2016).
- Ware Prize in Mathematics at Jesus College, University of Cambridge (2015).
- Bronowski Prize in Mathematics at Jesus College, University of Cambridge (2014).
- Exhibition Award at Jesus College, University of Cambridge (2014).

**Supervising:**

- Bye-Fellowship at Lucy Cavendish College, Cambridge, 2022-23.
- Cambridge Mathematics Part IB (2nd year undergraduate) Variational Principles, Michaelmas term, 2017, 2018, 2019, 2020, 2021, 2022.
- Cambridge Mathematics Part II (3rd year undergraduate) Dynamical Systems, Michaelmas term, 2017, 2018, 2019, 2020.
- Cambridge Mathematics Part II (3rd year undergraduate) Classical Dynamics, Michaelmas term, 2018, 2019.
- Cambridge Mathematics Part II (3rd year undergraduate) General Relativity, Lent term, 2019, 2020.
- Imperial MSc project on Well-posedness of the Navier-Stokes Phase-Field Crystal system, Muhammed Ali Mehmood, 2021-2022.

**Assessment Marking:**

- Sixth Term Examination Papers, Marking, 2016, 2017, 2018, 2019.
- Sixth Term Examination Papers, Marking Supervisor, 2020.
- Part II Integrable Systems, Numerical Analysis and Mathematical Biology, Mark Checking, 2019.

**Other Interests:**

I enjoy playing badminton for Cambridge City Club. I am an enthusiastic member of Cambridge Kung-Fu, studying Wing Chun. I have also been an assistant instructor in Wing Chun beginner classes and have assisted at two free self-defence workshops run by their group for the community.