

I am an expert in the use of strong-field gravity to probe fundamental physics. My area of specialisation is numerical relativity, which is the use of high-performance computing methods to solve Einstein's equations of general relativity to study cosmological and astrophysical phenomena in the most extreme regimes of gravity. This emerging and exciting field of research is one of the most promising areas to search for new physics with the detection of gravitational waves.

I am also an active and excellent communicator, with over 16 invited seminar and conference talks during my PhD. Movies of my research can be found on my twitter page: @jc\_aurrekoetxea.

## Education

### **PhD, Theoretical Particle Physics and Cosmology Dept, King's College London**

Expected date of submission: Sept. 2021

London, UK, Oct. 2017 – Sept. 2021

### **MSc, Quantum Fields and Fundamental Forces, Imperial College London**

Distinction. Abdus Salam Prize – best MSc graduate.

London, UK, Oct. 2016 – Sept. 2017

### **Degree in Physics, Theoretical Physics Dept, University of the Basque Country**

Average mark: 80.1%. Award with Excellence.

Bilbao, ES, Sept. 2012 – June 2016

## Awards and Fellowships

**International Student Visiting Fellowship** – Tokyo Institute of Technology, 2020.

**Extreme Scale Computing Fellowship (ATPESC)** – Argonne National Lab, US, 2019.

**Abdus Salam Prize, best performance in MSc** – Imperial College London, 2017.

**MSc Fellowship at Imperial College London** – Provincial Council of Biscay, 2016.

## Publications

I have 3 publications in peer-reviewed journals, 1 preprint and 3 articles in preparation.

### **Coherent gravitational waveforms and memory from cosmic string loops**

Josu C. Aurrekoetxea, Thomas Helfer, Eugene A. Lim.

**Class.Quantum.Grav**, (2020), arXiv: 2002.05177, DOI: 10.1088/1361-6382/aba28b

### **The effects of potential shape on inhomogeneous inflation**

Josu C. Aurrekoetxea, Katy Clough, Raphael Flauger, Eugene A. Lim.

**JCAP**, 05 (2020) 030, arXiv: 1910.12547, DOI: 10.1088/1475-7516/2020/05/030

### **Cosmic string loop collapse in full general relativity**

Thomas Helfer, Josu C. Aurrekoetxea, Eugene A. Lim.

**PRD**, 99 (2019) 10, arXiv: 1808.06678, DOI: 10.1103/PhysRevD.99.104028

### **Distinguishing atypical gravitational-wave progenitors with black hole spectroscopy**

Andrew Williamson, Josu C. Aurrekoetxea, Thomas Helfer, Eugene A. Lim, Samaya Nissanke.

**TBA**, (2020), arXiv: 2011.XXXXX

### **On the amplitude of scalar quasi-normal modes in scalar-tensor theories**

Josu C. Aurrekoetxea, Katy Clough, Pedro G. Ferreira, Eugene A. Lim, Oliver Tattersall.  
**in progress**, (2020), arXiv: in preparation

### **Primordial black hole formation from superhorizon collapse**

Eloy De Jong, Josu C. Aurrekoetxea, Eugene A. Lim.  
**in progress**, (2020), arXiv: in preparation

### **Non-minimally coupled strings in multi-scalar-tensor theories of gravity**

Josu C. Aurrekoetxea, Katy Clough, Pedro G. Ferreira, Eugene A. Lim, Oliver Tattersall.  
**in progress**, (2020), arXiv: in preparation

## **Invited Seminars**

**Tokyo Institute of Technology** (JPN), Cosmology seminar, March 2020.

**University of Oxford** (UK), Astrophysics group meeting, February 2020.

**University of Cambridge** (UK), DAMTP GR Seminar, November 2019.

**London Strong Gravity Meeting** (UK), Royal Society, January 2019.

**University of the Basque Country** (ES), Christmas conference, December 2018.

**University of the Basque Country** (ES), Christmas conference, December 2017.

## **Conference Talks**

**GR Simulations in Cosmology** (UK), Queen Mary University, September 2020.

**Particles Strings and Cosmology** (UK), University of Manchester, July 2019.

**UKCosmo** (UK), DAMTP, University of Cambridge, May 2019.

**IberICOS** (ES), University of the Basque Country, April 2019.

**Cosmic Topological Defects** (NL), University of Leiden, October 2018.

**Perimeter Institute** (Canada), Poster pres., TRISEP summer school, July 2018.

**University of Barcelona** (UAB, ES), Poster pres., GW summer school, July 2018.

**Numerical Relativity beyond General Relativity** (ES), Benasque, June 2018.

**Iberian Gravitational Waves Meeting** (ES), University of Balearic Islands, May 2018.

**Young Theorist Forum 8** (UK), University of Durham, January 2018.

## **Conference organisation**

**European Einstein Toolkit Meeting** (UK), King's College London, September 2019.

**London Strong Gravity Meeting** (UK), Royal Society, January 2019.

## **Teaching**

During my PhD at King's College London I have gained experience leading tutorials and problem classes for physics undergraduates and I am open to new teaching opportunities.