

Tamara Evstafyeva

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I am a 4th year PhD student at the University of Cambridge pursuing research in the Department of Applied Mathematics and Theoretical Physics. I primarily focus on studying the phenomenology of binary black hole and boson star mergers through the prism of numerical simulations. My work also extends to certain modified theories of gravity and tests of general relativity using Bayesian inference. I enjoy working in interdisciplinary fields combining mathematics, theoretical physics and data science.

Education

University of Cambridge

PHD IN APPLIED MATHEMATICS AND THEORETICAL PHYSICS

- Main Supervisor: Professor Ulrich Sperhake
- Adviser: Dr Michalis Agathos

- Main courses: Scientific Programming in C++, Message Passing Interface, Machine Learning for Fundamental Physics, Astrostatistics, Black Holes, Gravitational Waves and Numerical Relativity

Cambridge

2020 - present

University College London

MSc IN MATHEMATICS

- Masters thesis supervisor: Professor Christian Boehmer
- Masters thesis title: "Equations of motion for a small charged black hole"
- Main courses: General Relativity, Cosmology, Fluid Dynamics, Numerical Analysis, Differential Geometry, Functional Analysis

London

2016-2020

Skills

Programming: Python, C, C++, Bash, Mathematica, MATLAB, PyTorch

Visualisation Software: VisIt, Paraview

Languages: English (fluent), Russian (fluent), French (beginner)

Publications

PUBLISHED

T. Evstafyeva, U. Sperhake, T. Helfer, R. Croft, M. Radia, B. Ge, E. A. Lim. 2023. Unequal-mass boson-star binaries. Initial data and merger dynamics. *Classical and Quantum Gravity* 40, 085009

T. Evstafyeva, M. Agathos, J. Ripley. 2023. Measuring the ringdown scalar polarization of gravitational waves in Einstein scalar Gauss-Bonnet gravity. *Physical Review D* 107, 124010

R.Croft, T.Helfer, B. Ge, M. Radia, **T. Evstafyeva**, E. A. Lim, U. Sperhake. 2023. The gravitational afterglow of boson stars. *Classical and Quantum Gravity* 40, 065001

IN REVIEW

T. Evstafyeva, R.Rosca-Mead, U.Sperhake, B.Brugmann. 2023. Boson stars in massless and massive scalar-tensor gravity. 2023. e-Print: 2310.05200 [gr-qc] (positive comments received)

Llibert Aresté Saló, Sam E. Brady, Katy Clough, Daniela Doneva, **T. Evstafyeva**, P. Figueras, T. França, L. Rossi, S. Yao. 2023. GRFolres: A code for modified gravity simulations in strong gravity. e-Print: 2309.06225 [gr-qc]

Awards & Grants

2023 **Smith-Knight and Rayleigh-Knight Prize**, University of Cambridge

- 2022 **Sports Grant**, Newnham College
- 2021-2023 **Travel Grant**, Newnham College
- 2020-2024 **Science and Technology Facilities Council funding grant**, STFC
- 2020 **Book Grant**, Newnham College

Presentations

- Summer 2023. *Boson stars through the prism of numerical relativity*. Research Visit, Johns Hopkins University, US.
- Spring 2023. *Boson stars through the prism of numerical relativity*. BritGrav, University of Southampton, UK.
- Spring 2023. *Boson stars through the prism of numerical relativity*. Invited talk: General Relativity seminar, University of Cambridge, UK.
- Spring 2023. *Measuring the ringdown scalar polarization of gravitational waves in Einstein scalar Gauss-Bonnet gravity*. GRChombo meeting, King's College London, UK.
- Autumn 2022. *Measuring the ringdown scalar polarization of gravitational waves in Einstein scalar Gauss-Bonnet gravity*. LIGO Testing General Relativity telecon (online)
- Autumn 2022. *Unequal-mass boson star binaries: initial data and merger dynamics*. GRChombo meeting, University of Oxford, UK.
- Summer 2022. *Initial data for unequal-mass boson star collisions*. Frontiers in Numerical Relativity, Friedrich Schiller University, Germany.
- Spring 2021. *Visualization in ParaView Tutorial*. GRChombo meeting, University of Cambridge, UK.
- Spring 2021. *Binary black hole ringdown in the Einstein scalar Gauss-Bonnet gravity*. GRChombo meeting, University of Cambridge, UK.

Teaching & Marking Experience

Present	Research Computing for Data Intensive Science (MPhil) , Demonstrator	<i>Cambridge</i>
2023	STEP II Mathematics , Marker	<i>Cambridge</i>
2021	Mathematics for Natural Science Tripos , Exam Checker	<i>Cambridge</i>
2020-2022	Part II Electrodynamics , Supervisor	<i>Cambridge</i>
2020-2021	Part II General Relativity , Supervisor	<i>Cambridge</i>
2019	IB Mathematics Higher Level , Tutor at Westminster Academy	<i>London</i>
2018	Teach First Insight Internship , (offered graduate job)	<i>London</i>

Professional Memberships

- 2020-present **GRTL Collaboration (formerly known as GRChombo)**, member and contributor
- 2020-present **LIGO Scientific Collaboration**, member, attendance of Testing General Relativity telecons
- 2023-present **Einstein Telescope**, member
- 2023-present **LISA Consortium**, member

Service & Leadership

GROUPS

2021-present **Numerical Relativity group meetings**, organiser *Cambridge*

CONFERENCES

2023 **Kavli-Villum Summer School on Gravitational Waves**, local organiser: helping with daily sessions of the school, organising the poster session *Corfu*

OUTREACH

2022 **Diversity at DAMTP**, speaker: presentation of my research interests and ongoing academic work *Cambridge*

2020 **HE+ lecture on black holes**, lecturer *Cambridge (online)*

MENTORING

2022-2023 **Mentor to 1st year women in mathematics**, University of Cambridge: organising and running termly meetings, providing support and guidance *Cambridge*

PEER REVIEW

2023 **Reviewed 2 articles for Physical Review D**, by invitation

EXTRACURRICULAR

present **Artificial Intelligence Safety Intro Fellowship**, participant *Cambridge AI Safety Hub*

2022-2023 **Half-blues tennis captain for W2**, selected and appointed *Cambridge*

2020-present **Competing for University of Cambridge tennis team**, half-blues W2 player *Cambridge*