Lorenzo Speri

Gravitational Wave Astronomer

Keplerlaan 1, 2201AZ
Noordwijk, the Netherlands
lorenzo.speri@esa.int

Education

Oct. 2024 **Postdoctoral Research Fellow**, *European Space Agency, European Space Technology Centre, Noordwijk, the Netherlands*

June 2024 - Sept. 2024 **PostDoc**, *Max Planck Institute for Gravitational Physics (Albert Einstein Institute Potsdam)*

Sept. 2020 - June 2024 **Ph.D.**, *Max Planck Institute for Gravitational Physics (Albert Einstein Institute Potsdam) and Humboldt University*
Advisor: Dr. Jonathan R. Gair
Thesis title: *Advancing Gravitational Wave Astronomy: Novel Methodologies for Data Analysis and Waveform Modelling of Nanohertz and Millihertz Signals*
Final grade: summa cum laude (with distinction)

Sept. 2018 - Sept. 2020 **Master of Theoretical Physics MSc**, *University of Heidelberg*
Master thesis: *Effective Resonance Model: a small step for the constants of motion, a giant leap for biases in EMRI parameter estimation* jointly supervised by Jonathan Gair and Matthias Bartelmann. Master's Core specialization in General Relativity and Theoretical Astrophysics.
Degree examination: 1 (Top grade).

Sept. 2015 - Sept. 2018 **Bachelor of Physics BSc**, *University of Trento*
Erasmus+ Programme Scholarship: 10 months as an exchange student at the University of Oslo (2017/2018).
Thesis: *Analyzing Gravitational Waves through Numerical Simulations of Compact Binaries* under the supervision of Prof. Dr. Bruno Giacomazzo.
Degree examination: 110/110

Talks and Tutorials

Invited talks or seminars are indicated with *

Dec. 2024 **Challenges of LISA Data Analysis***
Institute for Gravitational and Subatomic Physics (GRASP), Utrecht

Nov. 2024 **Gravitational Wave Observations in the Millihertz Regime: Prospects and Challenges of the Upcoming LISA Mission***
GRAPPA Colloquium, Amsterdam.

October 2024 **LISA data analysis highlight***
LISA-Netherlands community day, Nikhef, Amsterdam.

July 2024 **FastEMRIWaveforms: Waveform package for asymmetric binaries**
15th LISA Symposium, Dublin.

June 2024 **Challenges and prospects of future Pulsar Timing Array analyses***
11th LISA Cosmology Working Group Workshop, Porto.

Dec. 2023 **With great precision comes great challenges: Gravitational Wave Observations of Extreme Mass Ratio Inspirals***
TAPIR Seminar, Caltech, Pasadena.

Sept. 2023 **Testing General Relativity with LISA observations***
Talk at Asymmetric Binaries meet Fundamental Astro-Physics, L'Aquila.

Aug. 2023 **Probing Accretion Physics with Gravitational Waves***
Seminar talk at OzGrav, online.

June 2023 **Beyond vacuum Extreme Mass Ratio Inspirals**
Hands-on session on implementing beyond vacuum effects in EMRI waveforms, 1st Trieste meeting on the physics of gravitational waves.

Jan.-Feb. 2023 **Extreme Mass Ratio Inspiral Waveforms in a nutshell***
Hands-on sessions on understanding EMRI waveforms with the Fast EMRI Waveform package. Two tutorial sessions of 2 hours at the University of Amsterdam.

Nov. 2022 **Fast EMRI Waveform package: New tools for millihertz gravitational-wave data analysis**
Talk at the LISA data analysis workshop: from classical methods to machine learning, Toulouse.

June 2022 **Probing accretion disk physics with Extreme Mass Ratio Inspirals**
Talk at 25th Capra meeting, Dublin.

June 2022 **Testing General Relativity with Extreme Mass Ratio Inspirals**
Talk at EuCAPT Workshop: Gravitational wave probes of black hole environments, Rome.

June 2021 **Assessing the impact of transient orbital resonances**
Talk at 24th Capra meeting, online.

March 2021 **Pulsar selection methods**
Talk at EPTA spring meeting, online

Awards and Scholarships

2024 **Burke Institute Prize Fellowships**, *Caltech*, (Declined)

2024 **NASA Postdoctoral Program Fellowship**, (Declined)

Sept. 2019 **Merit Award**, *University of Trento*
Students who have achieved remarkable results at the end of their degree

Sept. 2017 **Erasmus+ Programme Scholarship**, *University of Oslo*
4000 euros to support the exchange programme.

Teaching and Public Outreach

Nov. 2020 - March 2021 **Teaching assistant of Prof. Dr. Alessandra Buonanno for the course of Gravitational Waves**, *Humboldt University*

6th May 2023 **Potsdamer Tag der Wissenschaften**, *Potsdam University*
The university and the research institutes present their science in public talks in German, with exhibits and experiments.

Organisational Duties

Sept. 2021 - Sept. 2023 **Organizer of the AEI LISA meeting**
Monthly meeting in which I learned how to chair talks, select relevant science topics, and invite and network with external speakers.

Sept. 2022 - Sept. 2023 **Organizer of the AEI Group meeting**
Weekly meeting in which I organized the schedule of the internal activities, such as arxiv review, paper presentations and research updates.

June 2023 **Organizer of the 1st Trieste meeting on the physics of gravitational waves**
Scientific organizer taking care of speakers' invitation and schedule organization.

Membership

since 2020 **LISA Consortium full member**

since 2020 **EPTA full member**

since 2020 **IPTA full member**

Conferences, Workshops and Schools

July 2024 **15th LISA Symposium**, *Dublin, Ireland*

Sept. 2023 **Asymmetric Binaries meet Fundamental Astro-Physics**, *L'Aquila, Italy*

June 2023 **1st Trieste meeting on the physics of gravitational waves**, *Trieste, Italy*
Scientific organizer of the workshop

March 2021 **European Pulsar Timing Array meeting**, *Milan, Italy*

Nov. 2022 **LISA data analysis: from classical methods to machine learning**, *Toulouse, France*

July 2022 **Black Hole Perturbation Toolkit development workshop at ICERM (Brown University)**, *Providence, USA*

June 2022 **25th Capra meeting**, *Dublin, Ireland*

June 2022 **EuCAPT Workshop: Gravitational wave probes of black hole environments**, *Rome, Italy*

March 2021 **European Pulsar Timing Array meeting**, *Online*

Jan. 2021 **51st Saas-Fee Course, Compact-Object Astrophysics in the Era of Multi-Messenger Astronomy**, *Saas-Fee, Switzerland*

Aug. 2021 **NBIA Summer School on Gravitational Wave Astrophysics**, *Copenhagen*

June 2021 **24th Capra meeting**, *Online*

May 2021 **Workshop on Gravitational Wave Astrophysics for Early Career Scientists**, *Online*

2020 **LISA Symposium XIII**, *Online*

IT Skills

C++
Ordinary Differential Equation solvers and multidimensional interpolation.

Python
Bayesian inference and model selection. Frequentist statistical analysis and hypothesis testing. Sampling methods such as Reversible Jump Markov Chain Monte Carlo. Stochastic optimization. Graphics Processing Unit (GPU) programming for waveform modelling and data analysis.

GitHub
My GitHub profile and repositories can be found at `https://github.com/lorenzsp`

Language Skills

Italian Native language

English Fluent

German Intermediate