



Maria Paola Vaccaro

Born on July 11th, 1997

in Larino (CB), Italy

Currently in Heidelberg, Germany

✉ mariapaolavaccaro@gmail.com

🔗 mariapaolavaccaro.github.io

☎ +39 320 031 2701

Scientific interests

- Computational astrophysics
- Stellar evolution
- Gravitational waves sources
- Black holes dynamics
- Stellar clusters

Numerical tools

Python ●●●●

C/C++ ●●●○

Matlab ●●●○

Operating systems

Linux/Unix ●●●○

Windows ●●●○

Languages

Italian (mother tongue)

English (fluent, level C1)

Spanish (basic, level A2)

German (basic, level A1)

Education

Sep. 2023 – 2026 PhD in Astronomy and Cosmic Physics

At Institute for Theoretical Astrophysics (ITA), ZAH,
Heidelberg University in Heidelberg, Germany.

Supervisor: Prof. Michela Mapelli - Thesis title: "Binary Black
Hole population in the Local Universe"

Oct. 2020 – Sep. 2022 Master degree in Astrophysics

At Università degli Studi di Padova in Padua (PD), Italy. Final
grade: 110/110 *cum laude*, GPA: 29.4/30

Supervisor: Prof. Michela Mapelli - Thesis title: "Hierarchical
Black Holes Mergers in Active Galactic Nuclei"

Sep. 2019 – Jul. 2020 Master course in Matter Physics

At Università di Pisa in Pisa (PI), Italy - GPA: 28.8/30

Sep. 2016 – Sep. 2019 Bachelor degree in Physics

At Università di Pisa in Pisa (PI), Italy.

Final grade: 110/110 *cum laude*, GPA: 28.6/30

Supervisor: Prof. Pier Giorgio Prada Moroni - Thesis title:
"Cooling evolution of white dwarfs and cosmochronology"

Sep. 2011 – Jul. 2016 High school diploma

At Liceo Scientifico Alfano da Termoli in Termoli (CB), Italy.

Final grade: 100/100 *cum laude*

Aug. 2014 – Jul. 2015 High school exchange year

At Mead High School in Mead, Colorado, USA.

GPA: 4.0/4 - ACT score: 33/36

Funding

Member of the Young Research Convent of the Heidelberg

Cluster of Excellence STRUCTURES since October 1st, 2023.

Program funded by the German Excellence Strategy fund.

Pre-doctoral fellowship February 1st – August 31st, 2023

DEMOBLACK ERC Team at Università degli Studi di Padova,
Padua (PD), Italy. Supervisor: Prof. Michela Mapelli. Research
project: "Hierarchical evolution of stellar-sized binary black
holes in active galactic nuclei".

Internship in GW group October 1st – December 31st 2022

IFAE-UAB, Barcelona, Spain. Supervisors: Dr. Lluïsa-Maria
Mir i Martínez and Prof. Mario Martínez Pérez

Current activity

I am a computational astrophysicist, working in the field of gravitational-wave astronomy and black hole dynamics. I am the main developer of a semi-analytical code for the active galactic nucleus (AGN) disk scenario for hierarchical black hole mergers.

Scientific publications

As first author

Impact of gas hardening on the population properties of hierarchical black hole mergers in AGN disks

M. Paola Vaccaro, Michela Mapelli, Carole P  rigois, et al. 2024, *A&A*, 685, A51

As co-author

Hierarchical binary black hole mergers in globular clusters: mass function and evolution with redshift

Stefano Torniamenti, Michela Mapelli, et al. (incl. M. Paola Vaccaro), 2024, *Accepted by A&A*, arXiv:2401.14837

GW190521: a binary black hole merger inside an active galactic nucleus?

Sophia Morton, Stefano Rinaldi, et al. (incl. M. Paola Vaccaro) 2023, *Phys. Rev. D*, 108, 123039

The hitchhiker's guide to the galaxy catalog approach for gravitational wave cosmology

Jonathan R. Gair, Archisman Ghosh, Rachel Gray, et al. (incl. M. Paola Vaccaro), 2022, *AJ*, 166, 22

Conferences and workshops

Contributed Talk

University College Cork, Cork, Ireland

Massive Black Holes in the First Billion Years

April 29th – May 3rd, 2024

Talk title: "Possible constraints on the SMBH mass distribution from hierarchical BBH mergers in AGN discs".

Contributed Talk

University of Tokyo, Tokyo, Japan

RESCEU-NBIA workshop on GW sources

December 7th – 15th, 2023

Talk title: "The impact of Gas Hardening on Hierarchical Black Hole Mergers in Active Galactic Nuclei Disks".

Contribution to the [discussion panel](#) "Many-Body Systems".

Flash Talk

University of Milano Bicocca, Milan, Italy

Workshop "GwPopNext"

July 10th – 14th, 2023

Talk title: "Semi-analytical Model for Hierarchical Binary Black Hole Mergers".

Invited poster presentation

Lorentz Center, Leiden, Netherlands

Workshop "The Renaissance of Stellar Black-Hole Detections"

June 26th – 30th, 2023

Invited Speaker

Venetian institute of science, literature and art, Venice, Italy

Physics of Data Workshop

April 19th – 21st, 2023

Talk title: "How do black holes grow? Active galactic nuclei as a breeding ground for intermediate-mass black holes"

Colloquia

Invited presentation

GSSI, L'Aquila, Italy

"Astrocinini" Group Meeting (online)

April 26th, 2024

Talk title: "Specks of light from AGNs as possible indicators of dynamical formation of binary black holes"

Invited presentation

Galaxy Group Meeting, led by Prof. Ralf Klessen

ITA-ZAH, Heidelberg, Germany

March 27th, 2024

Invited presentation

Planet Formation Group Meeting, led by Prof. Cornelis Dullemond

ITA-ZAH, Heidelberg, Germany

February 20th, 2024

Schools and workshops attendance

- 4th G2Net Training School "A network for Gravitational Waves, Geophysics and Machine Learning" hosted by Aristotle University of Thessaloniki (remote attendance) March 28th-30th, 2023
- Python Course (level advanced) hosted by ICFO in Barcelona, Spain November 24th-30th, 2022
- GW Open Data Workshop hosted by GWOSC (online event) May 23rd-25th, 2022
- IPAM Workshop III: Source inference and parameter estimation in Gravitational Wave Astronomy (remote attendance) November 15th-19th, 2021

Outreach

- Staff member of the cultural association Scholé based in Roccella Jonica (RC), Italy since 2020
- Member of the organizing committee for the Scholé "School of Physics" for high schoolers since 2022
- Speaker and staff member at the 2023 Scholé Summer School titled "PHYSIS" ("Nature"). Talks:
 - "Understanding Nature with Quantum Mechanics" with Prof. Giancarlo Cella (Pisa, Italy) July 25th, 2023
 - "The concept of space from Newton to Einstein" with Prof. Paolo Bussotti (Udine, Italy) July 29th, 2023
- Author of a pamphlet about stellar evolution, distributed to 13th-grade high schoolers in the school Liceo Volta (Reggio Calabria, Italy) by Scholé 2024

Awards and other activities

- Don Peppe Presutto award from Circolo CFR Serracapriola for academic achievements 2016, 2020, 2023
- Aupair program in Cork, Ireland for language enhancement 2018
- Lions Club Tifernus award and 1000€ scholarship for educational achievements 2016
- Internship in the local newspaper Termolionline in Termoli (CB), Italy 2014