Erika **Korb**

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EDUCATION

Now (Sep 2025)

PhD student in Astrophysics, University of Padua

Oct 2022 Thesis: Binary compact object populations

Supervisor: Prof. Michela Mapelli; Co-Supervisor: Prof. Giuliano Iorio

> I study the correlation between stellar structure and mass transfer efficiency, simulating stellar and binary processes with the stellar evolution software MESA. I aim to extract fitting-formulae and tables that can be implemented by population-synthesis codes, allowing for more realistic simulations, and contributing to the science case for Einstein Telescope.

Sep 2022 Master in Astrophysics and Cosmology, University of Padua

110/110 cum laude

Oct 2020 Thesis: Wolf-Rayet - black hole binaries as progenitors of binary black holes

Supervisor: Prof. Michela Mapelli; Co-Supervisor: Dr. Giuliano Iorio

Sep 2020 Bachelor in Astronomy, University of Padua 110/110 cum laude

OCT 2017 Thesis: Impact of mass transfer efficiency on the formation of binary compact objects

Supervisor: Prof. Michela Mapelli; Co-Supervisor: Dr. Giuliano Iorio

VISITING RESEARCHER

Oct 2024 - Mar 2025

University of Heidelberg - Institute for Theoretical Astrophysics (ITA-ZAH)

Mar-Apr, Jun 2024 Host: Prof. Michela Mapelli

Prizes and Grants

2024 Fondazione Gini Scholarship by the Fondazione Aldo Gini

6 Website

- > Financial support for STEM research internship outside Italy.
- > 4600 € scholarship to support a 6 months research project in Heidelberg.

2023 Geppina Coppola Prize by the Geppina Coppola Association, INAF-OACN & Website

- **>** Best master thesis in astronomy in Italy.
- ▶ 1500 € prize, $\sim 2.5\%$ success rate, 2 invited talks to Naples (INAF-OACN).

2020 Mille e una lode by the University of Padua

6 Website

- **>** I was in the $\leq 3\%$ of students with the highest average grade in my bachelor.
- > 1000 € scholarship for a 250 hours internship. I included it in my master thesis work.

2016, 2015 | Il cielo come laboratorio by the University of Padua

6 Website

- > 3-days internship at the Asiago observatory. Photometric and spectroscopic data analysis.
- $> \sim 23\%$ success rate, regional selection.

99 Publications

FIRST-AUTHOR

Wolf-Rayet - compact object binaries as progenitors of binary compact objects

E. Korb, M. Mapelli, G. Iorio, G. Costa

Oct 2024 - Submitted to $A \mathcal{C}A$.

arxiv.org/abs/2410.08965

Co-author

Impact of accretion-induced chemically homogeneous evolution on stellar and compact binary populations

M. Dall'Amico, M. Mapelli, G. Iorio, G. Costa, S. Charlot, E. Korb, C. Sgalletta, M. Lecroq Jan 2025 - Submitted to A&A

The boring history of Gaia BH3 from isolated binary evolution

G. Iorio, S. Torniamenti, M. Mapelli, M. Dall'Amico, A. A. Trani, S. Rastello, C. Sgalletta, S. Rinaldi, G. Costa, B. A. Dhal-Lahtinen, G. J. Escobar, **E. Korb**, M. P. Vaccaro, E. Lacchin, B. Mestichelli, U. N. Di Carlo, M. Spera, M. Arca Sedda

Oct 2024 - A&A 690, pg. A144

■ ui.adsabs.harvard.edu/abs/2024A%26A...690A.144I/abstract

Compact object mergers: exploring uncertainties from stellar and binary evolution with SEVN

G. Iorio, M. Mapelli, G. Costa, M. Spera, G. J. Escobar, C. Sgalletta, A. A. Trani, **E. Korb**, F. Santoliquido, M. Dall'Amico, N. Gaspari, A. Bressan

Sep 2023 - MNRAS 524, pg. 426

ui.adsabs.harvard.edu/abs/2023MNRAS.524..426I/abstract

PROCEEDING

Compact objects with Wolf-Rayet companions: a key binary configuration to produce gravitational wave mergers

E. Korb

Dec 2024 - Bulletin de la Société Royale des Sciences, 93, 3, pgs. 363-373

Contribution to 41st LIAC conference

 \blacksquare ui.adsabs.harvard.edu/abs/2024BSRSL..93..363K/abstract

LISA S. UCB C. G.

BinCodex. LISA BPS Common Output Format v. 1.1.0

R. Valli, L. Graziani, and the LISA Synthetic UCB Catalogue Group (incl. E. Korb)

Apr 2024 - Non refereed

arxiv.org/abs/2311.03431

Conferences & Talks

Invited talks

Heraeus Summer School - Astronomy from Multiple Perspectives

Friedrich Schiller Universität Jena, Jena

1 - 6 Sep 2024

Astromeeting INAF-OACN ("Geppina Coppola" prize)

INAF Osservatorio Astronomico di Capodimonte, Naples

10 Nov 2023

Spring Workshop on Physics of Data

AI Society - University of Padua, Venice

21 - 22 Apr 2023

CONTRIBUTED TALKS

National Congress on Compact Objects (CNOC XIII)

INAF Osservatorio Astronomico di Cagliari, Alghero

23 - 26 Sep 2024

1st TEONGRAV international workshop on the theory of gravitational waves

Sapienza University of Rome, Rome

16 - 20 Sep 2024

41st LIAC: The eventful life of massive star multiples

Université De Liège, Liège

15 - 19 Jul 2024

The Renaissance of Stellar Black-Hole Detections in The Local Group

Lorentz Center, Leiden

26 - 30 Jun 2023

Panelist	Gravitational Wave Snowballs, Populations and Models (Workshop)				
	Sexten Center for Astrophysics, Sexten	20 - 24 Jan 2025			
Posters (online)	360° Approach to Common Envelope Evolution				
,	Institut Ciències del Cosmos Universitat de Barcelona, Barcelona	10 - 14 Jun 2024			
	Post-PAX meeting				
	Harvard-Smithsonian Center for Astrophysics, Boston	4 - 5 Aug 2022			
Attended	European Astronomical Society Annual Meeting				
	Padova Congress, Padua	1- 5 Jul 2024			
	Machine Learning 4 Astrophysics (Workshop)				
	25 Jun 2024				
	AI Society - University of Padua, Venice	8 Apr 2022			
SCHOOLS					
8 - 12 July 2024	Astrostatistics Summer School, University of Crete, Heraklion	& Website			
	> Machine Learning, Deep Learning, Simulation Based Inference, MCMC, 0	Optimization			
28 Aug - 1 Sep 2023	MESA Summer School 2023, Konkoly Observatory, Budapest	6 Website			
	> MESA stellar evolution software. Binaries and asteroseismology tutorials				
3 - 7 Oct 2022	3 rd Astrostatistics School, INAF Brera, Milan	6 Website			
	➤ Bayesian statistics applied to the astrophysical context (JAGS software)				
T EACHING					
Apr - Jun 2024	Laboratory of Computational Physics (Mod B.)	Teaching assistant			
Apr - Jun 2023	University of Padua, Master in Physics of Data	24 h.			
Ост 2023 - Feb 2024	Il cielo come laboratorio (astronomy course - outreach project)	Main teacher			
	High School "Benedetti-Tommaseo", Venice	16 h.			
Tupara do auto					
THESIS CO-SUPI	ERVISOR				
Master	Juan Manuel Pacheco Arias	2023			
	Hydrodynamical simulations of massive stars collisions	Master Thesis			
BACHELOR	Alberto Casellato	2024			
	Study on the effect of mass transfer stability on binary black hole properties	Bachelor Thesis			
MEMBERSHIPS	& COLLABORATIONS				
2024 - NOW	University of Heidelberg - Institute for Theoretical Astrophysics (ITA-ZA	H)			
2022 - NOW					
2022 - NOW	ET - Member of the Einstein Telescope collaboration	ium			
2022 - NOW	TEONGRAV - Member of the Theory of Gravitational Wave Sources collab	_			
2022 - NOW	adua & Website				
2020 - NOW					
2020 - NOW	DEMOBLACK - Member of the ERC-funded research group led by Michela	Mapelli & Website			



PHYSICS MUSEUM "GIOVANNI POLENI"

Museum guide, Padua

Oct 2023 - Ongoing

➤ I accompany visitors through the exhibition of historical (18-19-20th century) scientific instruments hosted at the "Giovanni Poleni" Physics Museum in Padua.

Project "Science from the Islamic world to today's Europe" Nov 2022 - Jun 2023

> I collaborated with PhD students and members of the Padua foreign communities to promote the instrument collection of the "Giovanni Poleni" Physics Museum of Padua. We designed new outreach projects to communicate scientific researches and teaching practices brought from the Islamic world to today's Europe.

Public Engagement Activities

Activity designer and facilitator for astronomical festivals, Castellaro Lagusello

- ➤ I designed and presented multisensorial activities for the astronomy festival in Castellaro Lagusello (Italy) (https://www.astronomiacastellaro.oapd.inaf.it/). The activities were developed to be accessible also to people with visual and hearing impairments.
- ➤ Light pollution activity (ongoing)

 Jan Jun 2025
- ➤ Astrolabe activity: https://play.inaf.it/caccia-al-ladro-fra-le-stelle/ Feb Jun 2024

Facilitator at European Researcher's Night - Science4All, Padua 28, 29 Sep 2024

> Facilitator in the hand-on activity "Cartoline Stellari", to introduce kids to constellations.

Activity designer and facilitator for the "Girl's Day", Heidelberg 25 Apr 2024

➤ I designed a gravitational-wave-themed activity for the Girl's Day event. The initiative, held at the University of Heidelberg, promoted STEM disciplines among young girls.

Facilitator with amateur astronomers, Padua

16 Jul 2019

➤ I collaborated with the amateur astronomers of Padua, using their telescopes to illustrate celestial objects in a public event organized for a partial lunar eclipse.

HIGH SCHOOL LECTURE COURSES

Main teacher of the course "Il cielo come laboratorio", Venice Oct 2023 - Feb 2024

➤ I held an astronomy course (16 h.) at the high school "Benedetti-Tommaseo" in Venice as part of the astronomy outreach project "Il cielo come laboratorio" coordinated by the University of Padua. The project offers university-orientation in scientific subjects to high school students. 4/30 of the students following my lessons were selected (~23% success rate) to participate in a 4-days stage at the Asiago observatory to analyze astronomical data.

Teacher on "Science and mythology of constellations", Venice 23, 24 Mar 2023

➤ I designed and held two lessons (4 h.) to students in the high school "Benedetti-Tommaseo" in Venice. I explained the link between constellation's mythology and astronomical phenomena, bringing spheres and gyroscopes in class, and scripting an ad-hoc plugin in *Stellarium*.

Public Talks | Research activity presentations to the general public

	10 the amateur astronomers of Treviso (Italy)	10 Jan 2025
2	For the "Geppina Coppola" prize at INAF-OACN, Naples	$10 \ \mathrm{Nov} \ 2023$
2	For the European Researcher's Night - Science4All in Padua	23 Sep 2023

SOFTWARE SKILLS

Advanced

Python (e.g., Numpy, Matplotlib, Seaborn, Plotly, Pandas, Dask, Scipy, Sklearn, Pytorch, Emcee, RegEx, Streamlit, Altair; Jupyter, IDLE), LATEX (TeXstudio, Overleaf), Slurm (Queue scheduler for HPC), Conda, Git, Linux, Windows, SEVN (Population-synthesis code), MESA (Stellar evolution software)

Intermediate

Markdown, Bash, Stellarium (scripting plugins for outreach), Inkscape/GIMP (Graphics)

Basic

C++, Fortran90, JAGS (Gibbs sampler), SAOImage DS9, TOPCAT, Olive (video editing)

LANGUAGES

	A1	AZ	ΒI	BZ	C1	C_2	
Italian							(native)
English						0	
GERMAN			0	0	0	0	