

Erika Korb

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EDUCATION

Now (DEC 2025)	PhD student in Astrophysics, University of Padua	
OCT 2022	Thesis: <i>Binary compact object populations</i> Supervisor: Prof. Michela Mapelli; Co-Supervisor: Prof. Giuliano Iorio	
	I study the formation channels of binary compact objects, focusing on the ones that are gravitational wave sources. I am contributing to the science case for Einstein Telescope by investigating the impact of stellar structure and mass transfer physics on the formation of binary black hole mergers. In my thesis, I use the stellar evolution software MESA and the population synthesis code SEVN , of which I am one of the developers.	
SEP 2022	Master in Astrophysics and Cosmology, University of Padua	110/110 cum laude
OCT 2020	Thesis: <i>Wolf-Rayet – black hole binaries as progenitors of binary black holes</i> Supervisor: Prof. Michela Mapelli; Co-Supervisor: Prof. Giuliano Iorio	
SEP 2020	Bachelor in Astronomy, University of Padua	110/110 cum laude
OCT 2017	Thesis: <i>Impact of mass transfer efficiency on the formation of binary compact objects</i> Supervisor: Prof. Michela Mapelli; Co-Supervisor: Prof. Giuliano Iorio	

VISITING RESEARCHER







OCT '24 - APR '25	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 Website
	I Financial support for STEM research internship outside Italy. I 4600 € scholarship to support a 6 months research project in Heidelberg.
2023	Geppina Coppola Prize by the Geppina Coppola Association, INAF-OACN Website
	I Best master thesis in astronomy in Italy. I 1500 € prize, ~ 2.5% success rate, 2 invited talks to Naples (INAF-OACN).
2020	Mille e una lode by the University of Padua Website
	I I was in the $\leq 3\%$ of students with the highest average grade in my bachelor. I 1000 € scholarship for a 250 hours internship. I included it in my master thesis work.

PUBLICATIONS

FIRST-AUTHOR	Wolf-Rayet – compact object binaries as progenitors of binary compact objects E. Korb , M. Mapelli, G. Iorio, G. Costa, M. Dall'Amico Mar 2025 - <i>A&A</i> , 695, A199 doi.org/10.1051/0004-6361/202452585
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CO-AUTHOR	<p>Impact of accretion-induced chemically homogeneous evolution on stellar and compact binary populations M. Dall’Amico et al. (incl. E. Korb) Mar 2025 - <i>A&A</i>, 695, A221  doi.org/10.1051/0004-6361/202453543</p> <p>The boring history of Gaia BH3 from isolated binary evolution G. Iorio et al. (incl. E. Korb) Oct 2024 - <i>A&A</i> 690, A144  doi.org/10.1051/0004-6361/202450531</p> <p>Compact object mergers: exploring uncertainties from stellar and binary evolution with SEVN G. Iorio et al. (incl. E. Korb) Sep 2023 - <i>MNRAS</i> 524, 426  doi.org/10.1093/mnras/stad1630</p>
PROCEEDING	<p>Compact objects with Wolf-Rayet companions: a key binary configuration to produce gravitational wave mergers E. Korb Dec 2024 - <i>Bulletin de la Société Royale des Sciences</i>, 93, 3, 363-373 <i>Contribution to 41st LIAC conference</i>  doi.org/10.25518/0037-9565.12414</p>
ET COLLABORATION	<p>The Science of the Einstein Telescope (ET blue book) Einstein Telescope collaboration (incl. E. Korb) Mar 2025 - <i>Non refereed</i>  arxiv.org/abs/503.12263</p>
LISA S. UCB C. G.	<p>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 - <i>Non refereed</i>  arxiv.org/abs/2311.03431</p>

SCHOOLS

15 - 17 OTT 2024	<p>MWGaiaDN School: Frontiers of Stellar Evolution, INAF-OAPD (online)  Website</p> <p>› Gaia catalogue, galactic surveys, population synthesis tools for stars (e.g. Trilegal code)</p>
8 - 12 JULY 2024	<p>Astrostatistics Summer School, University of Crete, Heraklion  Website</p> <p>› Machine and Deep Learning, Simulation Based Inference, MCMC, Optimization (Python)</p>
28 AUG - 1 SEP 2023	<p>MESA Summer School 2023, Konkoly Observatory, Budapest  Website</p> <p>› MESA stellar evolution software. Binary and asteroseismology tutorials.</p>
3 - 7 OCT 2022	<p>3rd Astrostatistics School, INAF Brera, Milan  Website</p> <p>› Bayesian statistics applied to the astrophysical context (JAGS software)</p>

CONFERENCES & TALKS



INVITED SEMINARS	<p>IGR Student Seminar <i>Institute for Gravitational Research</i>, Glasgow (online) 11 Jun 2025</p> <p>Heraeus Summer School - Astronomy from Multiple Perspectives <i>Friedrich Schiller Universität Jena</i>, Jena 1 - 6 Sep 2024</p> <p>Astromeeing INAF-OACN (“Geppina Coppola” prize) <i>INAF Osservatorio Astronomico di Capodimonte</i>, Naples 10 Nov 2023</p> <p>Spring Workshop on Physics of Data <i>AI Society - University of Padua</i>, Venice 21 - 22 Apr 2023</p>
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PANELIST	Gravitational Wave Snowballs, Populations and Models (Workshop) <i>Sexten Center for Astrophysics, Sexten</i>	20 - 24 Jan 2025
CONTRIBUTED TALKS	EAS 2025 - 2 talks (X-ray binaries and binary interactions sessions) <i>University College, Cork</i>	23 - 27 Jun 2025
	Stars II: current challenges, upcoming solutions <i>CNR Research Area, Bologna</i>	16 - 20 Jun 2025
	XV Einstein Symposium <i>CNR Research Area, Bologna (online)</i>	26 - 30 May 2025
	Galaxy Coffee <i>Max Planck Institute for Astronomy, Heidelberg</i>	27 Mar 2025
	National Congress on Compact Objects (CNOC XIII) <i>INAF Osservatorio Astronomico di Cagliari, Alghero</i>	23 - 26 Sep 2024
	1st TEONGRAV international workshop on the theory of gravitational waves <i>Sapienza University of Rome, Rome</i>	16 - 20 Sep 2024
	41st LIAC: The eventful life of massive star multiples <i>Université De Liège, Liège</i>	15 - 19 Jul 2024
	The Renaissance of Stellar Black-Hole Detections in The Local Group <i>Lorentz Center, Leiden</i>	26 - 30 Jun 2023
POSTERS	59th Rencontres de Moriond - Gravitation <i>Rencontres de Moriond, La Thuile</i>	30 Mar - 6 Apr 2025
	360° Approach to Common Envelope Evolution <i>Institut Ciències del Cosmos Universitat de Barcelona, Barcelona (online)</i>	10 - 14 Jun 2024
	Post-PAX meeting <i>Harvard-Smithsonian Center for Astrophysics, Boston (online)</i>	4 - 5 Aug 2022
ATTENDED	European Astronomical Society Annual Meeting <i>Padova Congress, Padua</i>	1- 5 Jul 2024
	Machine Learning 4 Astrophysics (Workshop) <i>Studio Villa Bosch, Heidelberg</i>	25 Jun 2024
	Spring Workshop on Physics of Data <i>AI Society - University of Padua, Venice</i>	8 Apr 2022

TEACHING EXPERIENCE

APR - JUN 2024	Laboratory of Computational Physics (Mod B.)	Teaching assistant
APR - JUN 2023	<i>University of Padua, Master in Physics of Data (Prof. Giuliano Iorio)</i>	24 h.
OCT '23 - FEB '24	The sky as a laboratory (astronomy course - outreach project) <i>High School "Benedetti-Tommaseo", Venice</i>	Main teacher 16 h.

MENTORING EXPERIENCE

MASTER	Juan Manuel Pacheco Arias <i>Hydrodynamical simulations of massive stars collisions</i>	2023  Master Thesis
BACHELOR	Alberto Casellato <i>Study on the effect of mass transfer stability on binary black hole properties</i>	2024  Bachelor Thesis

MEMBERSHIPS & COLLABORATIONS

2024 - NOW	University of Heidelberg - Institute for Theoretical Astrophysics (ITA-ZAH)	Website
2022 - NOW	LISA Synthetic UCB Catalogue Group - Contributor for SEVN catalogues	Website
2022 - NOW	LISA - Associate member of the Laser Interferometer Space Antenna consortium	Website
2022 - NOW	ET - Member of the Einstein Telescope collaboration	Website
2022 - NOW	TEONGRAV - Member of the Theory of Gravitational Wave Sources collaboration	Website
2022 - NOW	INFN - Affiliated to the Italian Institution for Nuclear Physics; Section of Padua	Website
2020 - NOW	DEMOBLACK - Member of the ERC-funded research group led by Michela Mapelli	Website

OUTREACH

PHYSICS MUSEUM “GIOVANNI POLENI”	Museum guide , Padua Oct 2023 - Ongoing ‣ Guide at the physics museum of historical (18-19-20th century) scientific instruments. Project “Science from the Islamic world to today’s Europe” Nov 2022 - Jun 2023 ‣ Communicating scientific researches and teaching practices brought from the Islamic world.
PUBLIC ENGAGEMENT	Activity designer and facilitator for astronomical festivals , Castellaro Lagusello ‣ Multisensorial activities for the astronomy festival in Castellaro Lagusello (Italy). ‣ Light pollution activity (ongoing) ‣ Astrolabe activity: https://play.inaf.it/caccia-al-ladro-fra-le-stelle/ Facilitator at European Researcher’s Night - Science4All , Padua ‣ Facilitator in the hand-on activity “Cartoline Stellari”, to introduce kids to constellations. Activity designer and facilitator for the “Girl’s Day” , Heidelberg ‣ Gravitational wave-themed activity for the Girl’s Day event in Heidelberg. Facilitator with amateur astronomers , Padua ‣ Telescope observations for a partial lunar eclipse event.
HIGH SCHOOL LECTURE COURSES	Main teacher of the course “The sky as a laboratory” , Venice ‣ University-orientation course in scientific subjects to high school students. Lecture on “Science and mythology of constellations” , Venice ‣ Linking constellation’s mythology and astronomical phenomena, with <i>Stellarium</i> .
PUBLIC TALKS	Research activity presentations to the general public ‣ To the amateur astronomers of Treviso (Italy) ‣ For the “Geppina Coppola” prize at INAF-OACN, Naples ‣ For the European Researcher’s Night - Science4All in Padua

SOFTWARE SKILLS

ADVANCED	Python (e.g., <i>Numpy</i> , <i>Matplotlib</i> , <i>Seaborn</i> , <i>Plotly</i> , <i>Pandas</i> , <i>Dask</i> , <i>Polars</i> , <i>Scipy</i> , <i>Sklearn</i> , <i>Pytorch</i> , <i>Keras</i> , <i>Tensorflow</i> , <i>Emcee</i> , <i>Regex</i> , <i>Streamlit</i> , <i>Altair</i> ; Jupyter, IDLE), L ^A T _E X (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	A2	B1	B2	C1	C2	
ITALIAN	●	●	●	●	●	●	(native)
ENGLISH	●	●	●	●	●	○	
GERMAN	●	●	○	○	○	○	