

Dr. Lorenzo Spina

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RESEARCH INTERESTS

I am an emerging leader in stellar spectroscopy with 7 years of experience in top research institutes around the globe. Through my research activity, I tackle the most challenging open questions regarding the structure and evolution of the **Milky Way** by studying ages, kinematics, and chemical compositions of stellar populations in different parts of our Galaxy.

I am deeply involved with important international collaborations such as **Gaia**, **Gaia-ESO**, **GALAH**, **WEAVE** and other networks committed to the scientific exploitation of future spectrographs, such as 4MOST, and HRMOS. Present and future Galactic surveys are causing a nearly insurmountable data avalanche which will rapidly increase its size in the following years. In order to exploit the full richness of this enormous body of data to its maximum potential, I have developed strategic skills in statistical analysis, with a specific interest in **Bayesian inference**, and **machine learning algorithms**.

I am also one of the world's leading experts in **high-precision spectroscopy**, a novel approach to measuring elemental abundances in stars with the highest precision to date. My research interests also include the **star-planet chemical connections** that can be unveiled at such high precision, and **exoplanet exploration**.

PROFESSIONAL EXPERIENCE

Nov 2020 – present	Postdoctoral Fellow INAF - Astronomical Observatory of Padua <ul style="list-style-type: none">• Galactic archaeology• Validation Gaia DR3 dataset• Star-Planet chemical connection
Nov 2017 – Oct 2020	Postdoctoral Fellow Monash University <ul style="list-style-type: none">• Galactic archaeology• Star-Planet chemical connection• Exoplanets
Jan 2015 – Sep 2017	Postdoctoral Fellow University of Sao Paulo <ul style="list-style-type: none">• Galactic archaeology• Star-Planet chemical connection• Exoplanets
Jul 2014 – Nov 2014	Research Fellow INAF - Astronomical Observatory of Arcetri <ul style="list-style-type: none">• Galactic archaeology• Validation Gaia-ESO dataset
Sep 2009 – Jan 2010	Research Fellow NASA - Space Telescope Science Institute <ul style="list-style-type: none">• Imaging of protoplanetary disks

EDUCATION

Jan 2011 – Jan 2014	Ph.D., Physics and Astronomy University of Florence Thesis: “Metal abundances of star forming regions and young clusters: towards a new paradigm with the Gaia-ESO Survey” Supervisors: Dr. F. Palla, Dr. S. Randich
Jan 2008 – Jul 2010	Master, Physics and Astronomy University of Florence Thesis: “Disks and jets from T Tauri stars and brown dwarfs in the stellar formation region Chamaeleon I” Supervisor: Dr. F. Palla
Sep 2004 – Jan 2008	Bachelor, Physics and Astronomy University of Florence Thesis: “Characterization of a liquid crystal variable retarder (LCVR) for applications in solar polarimetry” Supervisor: Dr. M. Romoli

REFEREED JOURNAL ARTICLES

63 publications.
13 papers as first or supervising author & other 4 papers as second or third author. These “lead-authored” papers constitute about 1/3 of my publications.
1400+ citations in total. 400+ citations from lead-authored papers.
h-index = 22 h-index = 12 from lead-authored papers.
m-index = $2.4 [\text{h-index} (22) / \text{years} (2021-2012)]$ “A value of m-index=2, characterizes outstanding scientists, likely to be found only at the top universities or major research laboratories.” Hirsch (2005) .

ACADEMIC PRESENTATIONS

8 departmental colloquia & seminars.
5 invited conference talks & seminars.
30+ conference talks.

SUPERVISION

2020–2021	Parth Sharma	Undergrad., Monash University	publication on Nature Astronomy
2019–2021	Giada Casali	Ph.D., University of Florence	2 student-led papers
2019	Tushar Nagar	Undergrad., Monash University	1 student-led paper

TEACHING

2021	<p>Lecturer of the course “Hands on machine learning” (3 hours) Gaia-ESO group, INAF-Arcetri</p> <ul style="list-style-type: none"> • Supervised ML algorithms, feature engineering. • Perceptron, SVM. • Tree models, Random forest, XGBoost.
2020	<p>Lecturer of the course “ASP2011 - Astronomy” (18 hours) 2nd year, Monash University</p> <ul style="list-style-type: none"> • Optical systems, aberrations, telescopes. • Atomic transitions. • Light diffraction and spectroscopy. • CCDs. • Adaptive optics, interferometry. • Exoplanets, detection techniques.
2019	<p>Guest lecturer, school “From Galileo to GPS: how science shapes society” (2 hours) Undergraduates, Monash University</p> <ul style="list-style-type: none"> • Star-Planet connections.
2018	<p>Guest lecturer, course “Origin of the elements” (2 hours) Honours, Monash University</p> <ul style="list-style-type: none"> • Galactic chemical evolution.

GRANTS

- FAPESP 2014 Post-doctorate fellowship (BLR 106k pa).
- FONDECYT 2014 Post-doctorate fellowship (CLP 24,400k pa). Declined.
- XXXth IAU General Assembly Grant (EUR 700).

GRANTED TIME AT COMPETITIVE TELESCOPES (P.I. only)

- HARPS @ 3.6m-La Silla (9 nights; Apr-Sep 2019)
- HARPS @ 3.6m-La Silla (7 nights; Aug-Sep 2018)
- HDS @Subaru Telescope (1 night; May 2018)
- UCLES @Anglo-Australian Telescope (3 nights; January 2018)
- HIRES @Keck (1.5 nights; December 2017)
- UVES @VLT-ESO (10 hours; Nov-Dec 2017)
- Graces @Gemini-North (7.7 hours; Nov-Dec 2016)
- UVES @VLT-ESO (11.8 hours; Nov-Dec 2015)
- Graces @Gemini-North (10.5 hours; Nov-Dec 2015)

OBSERVING RUNS

- DEIMOS at the Keck telescope (Mauna Kea, Hawaii).
- HARPS at the 3.6m telescope (La Silla, Chile).
- HDS at the Subaru telescope (Mauna Kea, Hawaii).
- HIRES at the Keck telescope (Mauna Kea, Hawaii).

- Goodman at the SOAR Telescope (Cerro Pachon, Chile).
- MUSICOS at the 1.6m Perkin-ELMER Telescope (Observatorio Pico dos Dias, Brazil).
- SARG at the Telescopio Nazionale Galileo (Las Palmas, Spain).
- UCLES at the Anglo-Australian Telescope (Siding Spring Observatory, Australia).

PROFESSIONAL SERVICES

On-going Galactic surveys

- Member of the Gaia Data Processing and Analysis Consortium.
- Member of the Gaia-ESO Survey.
- Member of the GALAH Survey.
- Member of the WEAVE Survey.
- Member of Stellar Population Astrophysics Programme.

Future Surveys and Instruments

- I am co-investigator of two proposals for public spectroscopic surveys with the 4MOST spectrograph.
- I participate in the science advisory group of the HDMOS spectrograph.

Editoring/Refereeing/Committee

2020 — Present	Guest editor of the special issue “Star clusters” of Universe (ISSN 2218-1997). Impact factor: 1.752.
2017 — Present	Referee for Monthly Notices of the Royal Astronomical Society, Astronomy & Astrophysics, and Astrophysical Journal.
2019	Assessor of proposals for observations at the Canary Islands telescopes.

Seminars/Conferences

Dec 2019 – Oct 2020	Organisation of Astro Seminars and Colloquia at the School of Physics and Astronomy, Monash University.
Dec 2019	Member of the Science Organisation Committee for Stars in Melbourne workshop.
Aug 2017	Member of the Local Organisation Committee for Precision Spectroscopy workshop.
Sep 2016	Member of the Science Organisation Committee for Precision Spectroscopy workshop.
Nov 2014	Member of the Local Organisation Committee for the Gaia-ESO WG10-11 workshop.

COMMUNITY ENGAGEMENT

Outreach

2016 – Present	Honorary member of the astrophile association “AstronomiAmo”.
2015 — 2017	Outreach activity for after-school programs in undeveloped area and penal institutions (Brazil).
2012 — 2014	Outreach activity and tour guide at the Astronomical Observatory of Arcetri (Italy).
2006 — 2007	Coordinator of “Student Point”, a student organisation for scientific outreach financed by the University of Florence.

Media

Interview with The New Scientist on the results published in Spina et al. (2015).	Link
Highlight by Media INAF on the results published in Spina et al. (2015).	Link
Highlight by the Arcetri Astrophysical Observatory on the results published in Spina et al. (2015).	Link
Interview with AstronomiAmo (an Italian association of amateur astronomers) about the chemical evolution of the Galactic disk.	Link
Interview with AstronomiAmo about the chemical signatures of rocky accretion found on a young solar type star.	Link
Interview with Segmento on my expat experience.	Link
Interview with Astronomy Australia on my experience as “observer” at La Silla Observatory.	Link