



RESEARCH INTERESTS

EXTRASOLAR PLANETS · ASTRONOMY INSTRUMENTATION · COMPUTER CODING FOR SCIENCE

EDUCATION

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| Nov. 2018 – present | Ph.D. in Astronomy, Astrophysics and Space Science <div style="text-align: right;">SAPIENZA UNIVERSITY OF ROME, ITALY</div> <p>Thesis subject: “Characterization of the atmospheres of extrasolar planets: Instrument design and science optimization of ARIEL, the exoplanet spectroscopic space mission of the next decade.”</p> <p>Tutor: Enzo Pascale.</p> |
| June – July 2018 | 24 CFU – Teacher formation program <div style="text-align: right;">SAPIENZA UNIVERSITY OF ROME, ITALY</div> <p>Formation for teaching, including exams in: psychology, pedagogy, anthropology, didactic.</p> |
| March 2018 | Professional training for .NET programmer <div style="text-align: right;">FOUNDED BY FORMA.TEMP, HOSTED BY EUSTEMA SPA</div> <p>Object Oriented Programming: C#.</p> <p>Application developing: HTML5, CSS 3, Javascript, LINQ to SQL, Entity Data Framework, ASP.NET MVC.</p> |
| 2015 – 2017 | M.D. in Astronomy and Astrophysics (summa cum laude) <div style="text-align: right;">SAPIENZA UNIVERSITY OF ROME, ITALY</div> <p>Thesis subject: “Near-Infrared multiband photometry of WASP-103b, a Hot Jupiter orbiting around a F type main-sequence star“, a research in collaboration with Keele, Cardiff and Tokyo Universities using data from the SIRIUS camera of IRSF telescope at SAAO.</p> <p>Thesis Advisor: Enzo Pascale’.</p> |
| 2008 – 2014 | B.D. in Physics and Astrophysics <div style="text-align: right;">UNIVERSITY OF FLORENCE, ITALY</div> <p>Thesis subject: “Optical and scanning electron microscopy analysis of spinels produced on extraterrestrial materials during simulation experiments of meteorite’s entry into the atmosphere“</p> <p>Thesis Advisor: Emanuele Pace.</p> |
| Aug. – Oct. 2013 | Learn to Program: The Fundamentals <div style="text-align: right;">UNIVERSITY OF TORONTO (ON-LINE COURSE)</div> <p>Python fundamentals and application.</p> |
| Apr. – May 2013 | Statistics: Making sense of data <div style="text-align: right;">UNIVERSITY OF TORONTO (ON-LINE COURSE)</div> <p>Statistical data analysis.</p> |

WORK EXPERIENCES

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| Nov. 2017 | Speech transcriber <div style="text-align: right;">INTERNATIONAL BALZAN PRIZE FOUNDATION (WEB PAGE)</div> <p>Responsible for the transcription of the lecture of Prof. F. Halzen for the annual foundation publication.</p> |
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- July – Aug. 2015 **General Maintainer** *DISCOVERY YUKON LODGING, YUKON, CANADA (WEB PAGE)*
 My responsibilities included: exploring forest, making new trails, general maintenance (e.g. gardening, painting, cabin building, minor repairs...), tracking bears.
- Sept 2010 – present **Private lessons**
 I give private lessons to students from high school to Masters in University. I teach physics, astrophysics, maths, computer science, statistics and chemistry. I offer lessons both remotely and in person.
- Sept 2009 – June 2015 **Personal trainer (part-time)** *"TRA CORPO E MENTE" gym, REGGELLO, FLORENCE, ITALY*
 My responsibilities included: posture training for teen and under-teen users, body building assistance, free body training course, assistance to physical rehabilitation.

TEACHING AND TUTORING

- 2021 **Master thesis co-advisor** *SAPIENZA UNIVERSITY OF ROME, ITALY*
 Claudia Masciulli, "Synergies and complementarities between JWST and EXCITE: advancing spectroscopy of exoplanet atmospheres"
- 2021 **Master thesis co-advisor** *SAPIENZA UNIVERSITY OF ROME, ITALY*
 Azzurra D'Alessandro, "Phase resolved spectroscopy with EXCITE for exoplanet atmospheric characterization"
- 2020 **Master thesis co-advisor** *SAPIENZA UNIVERSITY OF ROME, ITALY*
 Andrea Bocchieri, "Learning from Exo-Planetary Populations"
- Jan. – June 2019 **Lab2Go** *IIS NORBERTO TURRIZIANI, FROSINONE (FR)*
 Laboratory teaching experience with 20 high school students

PERSONAL SKILLS

Languages

	Understanding		Speaking		Writing
	Listening	Reading	Interaction	Production	
Italian	native	native	native	native	native
English ^a	C1	C2	C1	C1	C1

^aIELTS – British Council; License: 16IT003014MUGL264A; September 2016; Overall Band Score: 7,5

Communication Skills

Good communication skills, gained through my experience as novel writer in public events, as book presentations (schools, library, television...).

Training skills gained during my experience as trainer for the Italian Red Cross.

Organisational/managerial skills

Able to motivate and lead a team of more than 10 people.

Decisional skills: able to make strong decisions quickly, as required from my work as President of polling station (2015 - present).

Able to organise meetings, presentations, public events as required from my work as novelist.

Logistic management skills gained working on the public events related to the Enigma Live Game project (up to 150 participants).

Job - related skills

Teamwork and remote work skills;
Laboratory skills: able to perform

- Scanning Electron Microscopy EDS (skill gained during a traineeship at DAFNE laboratories of Frascati);
- X-Ray fluorescence analysis (skill gained during a traineeship at IAPS-INAF laboratories in Rome);
- Raman Spectroscopy analysis (skill gained during a traineeship at Earth Science laboratories of University of Florence).

Digital skills

Professional knowledge of Python.
Good use of Fortran90, IDL, LaTeX, MatLab, Octave, Bash, Fish, Zemax, C, C# and OfficeSuite.
Professional knowledge of .NET Framework aimed to business application development (ASP.NET MVC, HTML 5, CSS 3, Javascript, Bootstrap, jquery, LINQ, SQL, Razor).
Proficient user of Linux OS different distributions (Ubuntu, Fedora, Mint, Debian) and Windows OS.
Independent user of version control software and team work framework (git, visual studio, PyCharm).
Good command of text editing software gained as novel writer.
Good use of website development tools (WordPress, Google sites, HTML).

RESEARCH GRANTS

2021	VitaminaG (PI)	REGIONE LAZIO
	Sguardi sul cielo del Lazio	
2020	Avvio alla Ricerca (PI)	SAPIENZA UNIVERSITY OF ROME
	ExoSim 2: sviluppo di un nuovo simulatore per lo studio delle performance di Ariel	
2019 – 2020	UCL funded cities partnership (Co-PI)	UNIVERSITY COLLEGE LONDON
	Modelling the Performance of the Ariel Space Mission	
2019	Avvio alla Ricerca (PI)	SAPIENZA UNIVERSITY OF ROME
	Analisi delle performance della missione spaziale ARIEL	

ROLES

Sept. 2020 – Feb. 2021	Coordinator of Ariel Tiger Team working group
July 2019 – present	Italian contact for Ariel ExoClock

COLLABORATIONS

Apr. 2020 – present	Member of the EXCITE team
July 2019 – present	Member of the Ariel ExoClock group
Dec. 2018 – present	Member of the Ariel simulation working group
Dec. 2018 – present	Member of the Ariel calibration working group
Apr. 2018 – present	Member of the Ariel Consortium

PUBLICATIONS**JOURNAL ARTICLES**

- ① **Mugnai, L. V., & Modirrousta-Galian, D.** (n.d.). RAPOC: the Rosseland and Planck opacity converter. *submitted*.

- ② **Mugnai, L. V.**, Al-Refaie, A., Bocchieri, A., Changeat, Q., Pascale, E., & Tinetti, G. (2021). Alfnor: assessing the information content of Ariel's low resolution spectra with planetary population studies. *arXiv e-prints*, arXiv:2110.00503. arXiv: 2110.00503 [astro-ph.EP]
- ③ Encrenaz, T., Coustenis, A., Gilli, G., Marcq, E., Molaverdikhani, K., Mugnai, L. V., ... Tinetti, G. (2021). Observability of temperate exoplanets with Ariel. *Experimental Astronomy*. doi:10.1007/s10686-021-09793-x
- ④ Kokori, A., Tsiaras, A., Edwards, B., Rocchetto, M., Tinetti, G., Wünsche, A., ... Tomatis, A. (2021). ExoClock project: an open platform for monitoring the ephemerides of Ariel targets with contributions from the public. *Experimental Astronomy*. doi:10.1007/s10686-020-09696-3. arXiv: 2012.07478 [astro-ph.EP]
- ⑤ Szabó, G. M., Kálmán, S., Pribulla, T., Claret, A., **Mugnai, L. V.**, Pascale, E., ... Szabó, R. (2021). High-precision photometry with Ariel. *Experimental Astronomy*. doi:10.1007/s10686-021-09777-x
- ⑥ **Mugnai, L. V.**, Modirrousta-Galian, D., Edwards, B., Changeat, Q., Bouwman, J., Morello, G., ... Beaulieu, J.-P. (2021). ARES. V. No Evidence For Molecular Absorption in the HST WFC3 Spectrum of GJ 1132 b. *AJ*, 161(6), 284. doi:10.3847/1538-3881/abf3c3. arXiv: 2104.01873 [astro-ph.EP]
- ⑦ Charnay, B., Mendonça, J. M., Kreidberg, L., Cowan, N. B., Taylor, J., Bell, T. J., ... Zellem, R. T. (2021). A survey of exoplanet phase curves with Ariel. *Experimental Astronomy*. doi:10.1007/s10686-021-09715-x. arXiv: 2102.06523 [astro-ph.EP]
- ⑧ Guilluy, G., Gressier, A., Wright, S., Santerne, A., Jaziri, A. Y., Edwards, B., ... Beaulieu, J.-P. (2021). ARES IV: Probing the Atmospheres of the Two Warm Small Planets HD 106315c and HD 3167c with the HST/WFC3 Camera. *AJ*, 161(1), 19. doi:10.3847/1538-3881/abc3c8. arXiv: 2011.03221 [astro-ph.EP]
- ⑨ **Mugnai, L. V.**, Pascale, E., Edwards, B., Papageorgiou, A., & Sarkar, S. (2020). ArielRad: the Ariel radiometric model. *Experimental Astronomy*, 50(2-3), 303–328. doi:10.1007/s10686-020-09676-7. arXiv: 2009.07824 [astro-ph.IM]
- ⑩ Pluriel, W., Whiteford, N., Edwards, B., Changeat, Q., Yip, K. H., Baeyens, R., ... Beaulieu, J.-P. (2020). ARES. III. Unveiling the Two Faces of KELT-7 b with HST WFC3. *AJ*, 160(3), 112. doi:10.3847/1538-3881/aba000. arXiv: 2006.14199 [astro-ph.EP]
- ⑪ Skaf, N., Bieger, M. F., Edwards, B., Changeat, Q., Morvan, M., Kiefer, F., ... Beaulieu, J.-P. (2020). ARES. II. Characterizing the Hot Jupiters WASP-127 b, WASP-79 b, and WASP-62b with the Hubble Space Telescope. *AJ*, 160(3), 109. doi:10.3847/1538-3881/ab94a3. arXiv: 2005.09615 [astro-ph.EP]
- ⑫ Changeat, Q., Al-Refaie, A., **Mugnai, L. V.**, Edwards, B., Waldmann, I. P., Pascale, E., & Tinetti, G. (2020). Alfnor: A Retrieval Simulation of the Ariel Target List. *AJ*, 160(2), 80. doi:10.3847/1538-3881/ab9a53. arXiv: 2003.01839 [astro-ph.EP]
- ⑬ Edwards, B., Changeat, Q., Baeyens, R., Tsiaras, A., Al-Refaie, A., Taylor, J., ... Beaulieu, J.-P. (2020). ARES I: WASP-76 b, A Tale of Two HST Spectra. *AJ*, 160(1), 8. doi:10.3847/1538-3881/ab9225. arXiv: 2005.02374 [astro-ph.EP]
- ⑭ Edwards, B., **Mugnai, L. V.**, Tinetti, G., Pascale, E., & Sarkar, S. (2019c). An Updated Study of Potential Targets for Ariel. *AJ*, 157(6), 242. doi:10.3847/1538-3881/ab1cb9. arXiv: 1905.04959 [astro-ph.EP]

CONFERENCE PROCEEDINGS

- ① **Mugnai, L. V.**, Pascale, E., Changeat, Q., Al-Refaie, A., & Tinetti, G. (2020). Alfnor: assessing the information content of Ariel's low resolution spectra with planetary population studies. In *European planetary science congress (EPSC2020–272)*.
- ② Nikolaou, A., **Mugnai, L. V.**, Herbort, O., Pascale, E., & Woitke, P. (2020). Characteristics of an hybrid atmosphere with disk-captured and degassing contributions over a rocky planet's magma ocean. A modeling approach. In *European planetary science congress (EPSC2020–937)*.

- ③ Edwards, B., **Mugnai, L. V.**, Tinetti, G., Pascale, E., & Sarkar, S. (2019a). An Updated Study of Potential Targets for Ariel. In *Epsc-dps joint meeting 2019* (Vol. 2019, EPSC-DPS2019–603).
- ④ **Mugnai, L. V.**, Edwards, B., Papageorgiou, A., Pascale, E., & Sarkar, S. (2019). ArielRad: the ARIEL Radiometric Model. In *Epsc-dps joint meeting 2019* (Vol. 2019, EPSC-DPS2019–270).
- ⑤ Edwards, B., **Mugnai, L. V.**, Tinetti, G., Pascale, E., & Sarkar, S. (2019b). An Updated Study of Potential Targets for Ariel. In *Aas/division for extreme solar systems abstracts* (Vol. 51, p. 330.02).
- ⑥ Pascale, E., Bezawada, N., Barstow, J., Beaulieu, J.-P., Bowles, N., Coudé du Foresto, V., ... Zingales, T. (2018). The ARIEL space mission. In M. Lystrup, H. A. MacEwen, G. G. Fazio, N. Batalha, N. Siegler, & E. C. Tong (Eds.), *Space telescopes and instrumentation 2018: Optical, infrared, and millimeter wave* (Vol. 10698, 106980H). doi:10.1117/12.2311838

SCHOOLS ATTENDED

27 Sept –6 Oct 2019	ARES (ARIEL Retrieval Exoplanet School).	BIARRITZ, FRANCE
27 – 31 May 2019	3rd Advanced School on Exoplanetary Science (ases3) Demographics of exoplanetary systems.	VIETRI SUL MARE, ITALY

CONFERENCES AND WORKSHOPS

ATTENDANCE WITH SCIENTIFIC CONTRIBUTION - TALK

16 – 19 June 2021	Speaker at Ariel Virtual Consortium Meeting Alfnoor: ARIEL Tier 1 and Tier 2 population studies	VIRTUAL MEETING
7 May 2021	Speaker at Ariel AMS Prepare ARIEL science with performance simulations.	VIRTUAL MEETING - IAPS
10 – 12 Feb 2021	Speaker at Ariel Virtual Consortium Meeting Tiger Team Report.	VIRTUAL MEETING
21 Sept. – 9 Oct. 2020	Speaker at EPSC 2020 Alfnoor: assessing the information content of Ariel's low resolution spectra with planetary population studies.	VIRTUAL MEETING
17 – 19 Sept. 2020	Speaker at Sapienza's "Astrophysics Workshop" 2020 Atmospheric characterization of Transiting Exoplanets with Ariel.	SAPIENZA UNIVERSITY OF ROME
12 – 14 May 2020	Speaker at Ariel Virtual Consortium Meeting Assessing the information content of ARIEL's low resolution spectra with planetary population study.	VIRTUAL MEETING
14 – 16 Jan 2020	Speaker at ARIEL Open Conference Results from Alfnoor population study.	ESA ESTEC
28 – 29 Nov 2019	Speaker at Ariel Planetary formation workshop ARIEL performance simulations.	IAPS, ROME
7 – 9 Oct 2019	Speaker at Ariel Consortium Meeting Alfnoor, the ARIEL thousand lights simulator.	UTRECHT
17 – 19 Sept 2019	Speaker at Sapienza's "Astrophysics Workshop" 2019 Atmospheric characterization in Transiting Exoplanets.	SAPIENZA UNIVERSITY OF ROME
17 – 19 June 2019	Speaker at Ariel Consortium Meeting 1. Noise Analysis: gain noise and parameters trade-off 2. Updates on ArielRad, the ARIEL radiometric model	WARSAW
18 – 20 March 2019	Speaker at Ariel Consortium Meeting ArielRad, the new ARIEL radiometric model	PALERMO
8 – 10 May 2018	Speaker at Ariel Consortium Meeting Effects of intra/pixel morphology on AIRS noise budget	PRAGUE

ATTENDANCE WITH SCIENTIFIC CONTRIBUTION - POSTER

15 – 20 Sept 2019	Poster contribution at EPS-DPS 2019 ArielRad: the new ARIEL radiometric model.	GENEVA
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ATTENDANCE WITHOUT CONTRIBUTION

9 – 12 March 2021	Participant at Exoplanets-A virtual workshop Exoplanet atmosphere characterization: from HST and Spitzer to JWST	VIRTUAL WORKSHOP
19 – 23 July 2021	Participant at Sagan Exoplanet Summer Virtual Workshop Circumstellar Disks and Young Planets	VIRTUAL WORKSHOP
11 – 13 Dec 2018	Participant at Ariel Consortium Meeting	DUBLIN

ATTENDANCE AS AN ORGANISER

18 – 19 May 2021	SOC at Ariel-IT SCI - the ARIEL meeting for Italian contributors	VIRTUAL MEETING
Dec 2020 – present	LOC of “Quid Ultra? Frontiers and Controversies in Astrophysics”	SAPIENZA UNIVERSITY OF ROME
Oct 2019 - July 2020	Organiser of Sapienza’s “Astrophysics journal Club” (website)	SAPIENZA UNIVERSITY OF ROME
17 – 19 Sept 2019	LOC of Sapienza’s “Astrophysics Workshop” 2019	SAPIENZA UNIVERSITY OF ROME
1 – 7 July 2018	LOC member at Fifteenth Marcel Grossmann Meeting - MG15	SAPIENZA UNIVERSITY OF ROME

BOOKS

Jan. 2018	I figli di El. L. Mugnai. Bibliotheka edizioni, ISBN 9788869343858.
Apr. 2010	Il Cammino dei Draghi. L'alba della Guerra. L. Mugnai, L. Righi. Polistampa Edizioni, ISBN 9788856300390.
Apr. 2009	Il Cammino dei Draghi. Ali di Pietra. L. Mugnai, L. Righi. Polistampa Edizioni, ISBN 9788856300239.

PROJECTS

2021 – present	Astronomers for Planet Earth – it is a grass-roots movement uniting astronomy students, educators, and scientists to share their astronomical perspective about the Earth and climate change (web page)
2021 – present	Partner. AstroNut – Outreach, courses and private lessons (web page)
2016 – present	Founder, content creator. Enigma live game – A customisable digital treasure hunt for smartphone (web page)
2010 – 2016	Administrative manager, image manager, content creator and social manager. Gotta Tech Em All- tech guides blog (web page) Content creator and writer.

EXTRACURRICULAR ACTIVITIES AND SKILLS

2021 - present	Member of MENSA (web site) Play the guitar. Creative writing. Driving license: B.
2015– present	President of polling station

- 2015 Survival skills
gained during my work as general maintainer, explorer and bear tracker at Discovery Yukon Lodging in Yukon, Canada ([web page](#))
- 2006– 2012 First Aid. Ambulance operator and trainer for Italian Red Cross