

**Quarta edizione del premio
MOST PROMISING RESEARCHER IN ROBOTICS AND ARTIFICIAL INTELLIGENCE**

FORMATO CV ACCADEMICO DA ALLEGARE

PERSONAL INFORMATION

Family name, First name: Bile Alessandro

EDUCATION

Academic Years

2025-2026 Master in Quantum Optics at the Faculty of Civil Engineering. (thesis to be discussed in

2019-2022 PhD

Faculty of Civil Engineering, Department of Basic and Applied Sciences, Sapienza Università di Roma, Italy, Supervisor: prof. Eugenio Fazio. Evaluation: excellent. Special Mention: Doctor Europaeus.

Mar 2023 Master's degree in Electronic Music

Faculty of Composition, Electronic Department, Conservatorio Santa Cecilia di Roma, Italy. Supervisor: M^o Nicola Bernardini. Evaluation: 110/110 and Lode.

Jan 2019 Master's degree in Theoretical Physics

Faculty Mathematical and Physical Sciences, Department of Physics, Sapienza Università di Roma, Italy, Supervisor: prof. Pia Astone and prof. Sergio Frasca. Evaluation: 110/100 and Lode.

Mar 2018 Bachelor's degree in Electronic Music

Faculty of Composition, Electronic Department, Conservatorio Santa Cecilia di Roma, Italy. Supervisor: M^o Riccardo Santoboni Evaluation: 110/110 e Lode.

Dec 2016 Master's degree in Theoretical Physics

Faculty Mathematical and Physical Sciences, Department of Physics, Sapienza Università di Roma, Italy, Supervisor: prof. Pia Astone and prof. Sergio Frasca. Evaluation: 110/100 and Lode.

CURRENT POSITION

2025-2026 Research Fellow

Senior Post-Doc related to the research project "ONEPLAST: Optical Neuroplasticity to memorize and recognize information" at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Eugenio Fazio.

PREVIOUS POSITIONS

2024-2025 Research Fellow

Senior Post-Doc related to the research project "ONEPLAST: Optical Neuroplasticity to memorize and recognize information" at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Eugenio Fazio.

2024-2025 AI Consultant Trainer

Consulting activities for the delivery of courses on Artificial Intelligence at Europass Teacher Academy, Rome, Italy.

- 2024-2025 **AI Consultant Trainer**
Consulting activities for the delivery of courses on Artificial Intelligence at Digital Education Lab, Rome, Italy.
- 2023-2024 **Research Fellow**
Post-Doc related to the research project "Development of materials, metamaterials and polar metasurfaces for manipulating mid-infrared emission", at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Maria Cristina Larciprete.
- 2022-2023 **Research Fellow**
Post-Doc related to the research project "*Study pilot demonstration for the preparation and dissemination of forecast biophysical supports to the application of integrated and organic production*", at the Physics Department of the University of Torino, with scientific director Prof. Claudio Cassardo.
- 2022 **Research Fellow**
Research Award related to the experimental demonstration of "Solitonic X-Junction in Lithium Niobate On Insulator".
- 2022 **Physics and Mathematics Professor** at "Liceo Ginnasio Statale Visconti", High School in Rome.
- 2021-2022 **Research Fellow**
Position related to the research project "*Intelligent optical systems for recognition and sanification of pathological micro- and nano-organisms*" at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Eugenio Fazio.
- 2019-2021 **Research Fellow**
Position related to the research project "*Optical and optoelectronic systems for signal processing and monitoring of cultural heritage*" at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Eugenio Fazio.
<https://www.collectioncare.eu/about-us/>

FELLOWSHIPS AND AWARDS

- 21/01/2026 **Best Demo Award** in the Section "New Technologies Best Demo" for "Experimental apparatus to induce spatial solitons from a 400nm laser beam.
- 07/05/2025 **Mention of merit** for scientific research, Minerva Prize 5th edition, established by the Fondazione Roma Sapienza,
- 06-08-2023 **Winner of Fare Ricerca**, award grants for researchers and research fellows by Regione Lazio.
- 24/01/2022-
24/04/2022 **Research grant** awarded by the French government (BGF) to conduct three months of research activities in France – Budget 5112 €. <https://www.institutfrancais.it/italy/bags-of-the-French-government-0>
- 21/02/2022 **A. Bile** was awarded by the Communic-action! contest as the best communication strategy of scientific results through the work entitled "Sonification for the threshold comparison of real and predicted data through neural networks", the 4th congress of AISAM - Italian Association of Atmospheric Sciences and Meteorology, University of Milano, Italy.
<http://congresso.aisam.eu/comunic-azione.html>

TEACHING ACTIVITIES

- 2023-2026 **Physics 1 (FIS/01)** Civil and Ambient Engineering course (**3 CFU**) at the Faculty of Civil Engineering (Bachelor's Degree), Sapienza University of Rome, Italy.
- 2023-2026 **Fundamentals of mechanics – physics (FIS/07)** for the Medicine and Psychology – Medical and Surgical Sciences and Translational Medicine Orthopedic Techniques (**3 CFU**) – Rome Azienda Ospedaliera Sant'Andrea, Sapienza University of Rome, Italy.
- 2023-2024 **Medical Physics (FIS/07)** for the Medicine and Psychology – Medical and Surgical Sciences and Translational Medicine Orthopedic Techniques (**1 CFU**) – Rome Azienda Ospedaliera Sant'Andrea, Sapienza University of Rome, Italy.
- 2023-2024 **Physics 1 (FIS/01) professor for debt recovery** for the Medicine and Psychology – Medical and Surgical Sciences and Translational Medicine Orthopedic Techniques – Rome Azienda Ospedaliera Sant'Andrea, Sapienza University of Rome, Italy.
- 2022-2023 **Fundamentals of mechanics – physics (FIS/07)** for the Medicine and Psychology – Medical and Surgical Sciences and Translational Medicine Orthopedic Techniques (**3 CFU**) – Rome Azienda Ospedaliera Sant'Andrea, Sapienza University of Rome, Italy.
- 2022-2023 **Complementary Mathematics (MAT / 04)** for Techniques of prevention in the environment and in the workplace (**2 CFU**) at the Health profession of prevention technician in the environment and in the workplace Department – (Bachelor's Degree), Sapienza University of Rome, Italy.
- 2023 **Orientamento in Rete – Physics (FIS/01)**, Faculty of Medicine and Psychology, Sapienza University of Rome.
- 2021-2022 **Mathematical Analysis (MAT/05)** for Technical Professions for Construction and the Territory course at the Faculty of Civil Engineering (3 CFU) – (Bachelor's Degree), Sapienza University of Rome, Italy.
- 2022 Mathematics and Physics professor at Liceo Visconti of Rome, Italy.

INSTITUTIONAL RESPONSIBILITIES

Fundings

- 2024-2025 PI-principal investigator. Research Grant: start of research, funding for young researchers. Project title: All-optical implementation based on the extraction of characteristic patterns by hardware convolutional neural networks for the implementation of intelligent photonic devices. Funded by Sapienza University of Rome – Budget 2000,00 €. Reference: AR224190029D8129
- 2022-2023 PI-principal investigator. Research Grant: start of research, funding for young researchers. Project title: Realization of psycho-memories using soliton neural networks based on the photorefractive plasticity of nonlinear crystals. Funded by Sapienza University of Rome – Budget 2000,00 €. Reference: AR2221814D17193B
- 2022-2023 I-investigator. Sapienza University research projects. Project title: Study and implementation of a dense optical neural network capable of recognising recurring characteristics in data sets (images) Study and implementation of a dense optical neural network capable of recognising recurring characteristics in data sets (images). Funded by Sapienza University of Rome – Budget 3000,00 €. Reference: RP12218166ECCD89
- 2021-2022 PI-principal investigator. Research Grant: start of research, funding for young researchers. Project title: Study of complex photonic neural networks built through the use of soliton guides. Funded by Sapienza University of Rome – Budget 1000,00 €. Reference: AR12117A814F8BCA
- 2020-2021 PI-principal investigator. Research Grant: start of research, funding for young researchers. Project title: Photonic implementation of elementary units of artificial intelligence based on soliton guides. Funded by the "Sapienza" University of Rome – Budget 1000,00 €. Reference: AR120172B7152382

REVIEWING ACTIVITIES (if applicable)

1) Editor

Start	End	Journal
2025	-	Associate Editorial Board Member for the Journal "Progress in Nanoscience and Nanotechnology", Bentham Editor.
2024	2025	Guest Editor for the Journal Symmetry (MDPI) in the framework of the special issue entitled "Symmetry/Asymmetry in Neuromorphic and

		Intelligent Photonics”.
		https://www.mdpi.com/journal/symmetry/special_issues/9P4O6J26AC
2022	-	Editor for the International Journal of Information Security and Software Engineering.
2022	2022	Member of the Scientific Committee of the CMPmeet 2022, Munich, Germany
2022	2022	Member of the Program Committee of the International Conference on Neural Computing for Advance Applications (NCAA), Jian, China.

2) Reviewer

Start	End	Journal
2024	-	Photonics (MPDI)
2024	-	Symmetry (MDPI)
2024	-	Materials (MDPI)
2024	-	Optics Letters (OSA)
2023	-	Electronics (MDPI)
2023	-	Sustainability (MDPI)
2023	-	Applied Sciences (MDPI)
2023	-	Research on Biomedical Engineering (Springer)
2023	-	Neural Computing and Applications (Springer)
2023	-	Biological Signal Processing G Control (Elsevier)
2023	-	Qeios
2023	-	EURASIP Journal on Audio Speech and Music Processing (Springer)
2023	-	AIP Advances (AIP Publishing)
2023	-	Science G Education (Springer)
2023	-	Education Sciences (MDPI)
2020	-	Cognitive Neurodynamics (Springer)
2021	-	Technology, Knowledge and Learning (Springer)
2022	-	HardwareX (Elsevier)
2022	-	Modern Intelligent Times

<https://www.innovationforever.com/aboutjournal/MIT/PeerReviewers>

MEMBERSHIPS OF SCIENTIFIC SOCIETIES (if applicable)

2023 – 2025 Member, SIOF (Società Italiana di Ottica e Fotonica), Sesto Fiorentino, Italy.

2020 – 2022 Associated Member, SIF (Società Italiana di Fisica), Bologna, Italy.

2019 – 2021 Associated Member, AISAM (Associazione Italiana di Scienze dell'Atmosfera e Meteorologia), Rovereto, Italy.

PUBLICATIONS:

Monographies:

- 1) **A. Bile**, Reti Neurali Solitoniche: Un Innovativo Network Neurale Fotonico Basato su Interconnessioni Solitoniche, Springer (2024). ISBN-10: 3031613406, ISBN-13: 978-3031613401. <https://doi.org/10.1007/978-3-031-61341-8>
- 2) **A. Bile**, Solitonic Neural Networks: An Innovative Photonic Neural Network Based on Solitonic Interconnections. In (Ed.), AI in Materials – Springer (2023). ISBN-10: 3031486544. ISBN-13: 978-3031486548. <https://doi.org/10.1007/978-3-031-48655-5>

Journals:

- 1) E. Fazio, M. Bragaglia, A. Nabizada, F. Nanni, **A. Bile**, All-Optical Subtractive Convolution in Photochromic Absorbing Media, Optics Letters 51, 3 (2026), <https://doi.org/10.1364/OL.586072>. Number of Citations: 0
Journal Impact Factor: 3.56

- 2) **A. Bile**, D. de Ceglia, D. Ceneda, M.C. Larciprete, M. Centini, Compact Second-Harmonic Generation in the C-Exciton Band of 3R-MoS₂ for Integrated Quantum Photonics, ACS PHOTONICS 2025, <https://doi.org/10.1021/acsphotonics.5c01266>. Number of Citations: 0. Journal Impact Factor: 6.7
- 3) **A. Bile**, A. Nabizada, A. M. Hamza, E. Fazio, *Learning Dynamics of Solitonic Optical Multichannel Neurons*, Biomimetics 2025, 10, 645. <https://doi.org/10.3390/biomimetics10100645>. Number of Citations: 0. Journal Impact Factor: 4.5
- 4) **A. Bile**, *The innovative DEA application for color vision self-re-education of eyes suffering from dyschromatopsia*, Network Modeling and Analysis in Health Informatics and Bioinformatics Journal 14, 26 (2025). <https://doi.org/10.1007/s13721-025-00519-z>. Number of Citations: 0. Journal Impact Factor: 2
- 5) **A. Bile**, D. Ceneda, M. Centini, F. V. Lupo, D. P. Adorno, R. Macaluso, K. Aydin, M.C. Larciprete, *Thermo-Optical Properties of a-MoO₃ thin films in the mid-infrared and phonon frequency shift*, J. Phys Photonics, 2025, 7, 025015, <https://doi.org/10.1088/2515-7647/adbced>. Number of Citations: 1. Journal Impact Factor: 8.4
- 6) R. Pepino, H. Tari, **A. Bile**, A. Nabizada and E. Fazio, *Optical bacteria recognition: Cross-Polarized Scattering, Symmetry* 2025, 17(3):396, <https://doi.org/10.3390/sym17030396>. Number of Citations: 1. Journal Impact Factor: 2.2
- 7) V.R. Ireddy, I. Chiarotto, D. Ceneda, **A. Bile**, M. Centini, M.C. Larciprete, *Assessing Radiative Cooling Potential of Polymeric Films: a Quality Factor for Energy Efficient Materials*, Optical Materials, 2024, 116615, ISSN 0925-3467, <https://doi.org/10.1016/j.optmat.2024.116615>. Number of Citations: 0 Journal Impact Factor: 3.754
- 8) **A. Bile**, D. Ceneda, S.M. Vaghefi Esfidani, D. Sciré, M. Mosca, D. P. Adorno, R. Macaluso, R. Li Voti, C. Sibilìa, T. G. Folland, M. Centini, M.C. Larciprete, *Room-Temperature of Mid-Infrared Optical Phonons and Plasmons in W-doped VO₂ thin films*, Optical Materials, 2024, 115732, <https://doi.org/10.1016/j.optmat.2024.115732>. Number of Citations: 2 Journal Impact Factor: 3.754
- 9) **A. Bile**, H. Tari, R. Pepino, A. Nabizada, E. Fazio, *Photorefractive Simulates Well the Plasticity of Neural Synaptic Connections*. Biomimetics 2024, 9, 231. <https://doi.org/10.3390/biomimetics9040231>. Number of Citations: 4 Journal Impact Factor: 4.5
- 10) **A. Bile**, R. Santoboni, S. Frasca, P. Astone, *Gravitational Music: a mathematical model for the popularization of gravitational waves*, Physics Education 2024, 59, 6, <https://doi.org/10.1088/1361-6552/ad7347>. Journal Impact Factor: 1.5
- 11) A. Nabizada, H. Tari, **A. Bile**, E. Fazio, *Novel high-efficient buried gratings for selective coupling of SPP waves onto single interfaces*, Nanomaterials 2024, 14, 878. <https://doi.org/10.3390/nano14100878>. Number of Citations: 1 Journal Impact Factor: 4.7
- 12) **A. Bile**, M. Centini, D. Ceneda, A. Passaseo, V. Tasco, C. Sibilìa and M.C. Larciprete, *Tuning the Berreman mode of GaN/AlxGa1-xN heterostructures on sapphire: the role of the 2D-electron gas in the mid-infrared*, Optical Materials, 147, 2024, 114708, ISSN 0925-3467, <https://doi.org/10.1016/j.optmat.2023.114708>. Number of Citations: 0 Journal Impact Factor: 3.754
- 13) H. Tari, **A. Bile**, A. Nabizada and E. Fazio, *Immobilization of Photorefractive Solitons by Charge Anchoring on Conductive Walls*, Optics Letters, 48, 23, (2023), <https://doi.org/10.1364/OL.506249>. Number of Citations: 3 Journal Impact Factor: 3.56
- 14) **A. Bile**, M. Chauvet, H. Tari and E. Fazio *Supervised Learning of soliton X-junctions in Lithium Niobate films On Insulator*, Optics Letters 47, 21 (2022), <https://doi.org/10.1364/OL.468997>. Number of Citations: 17 Journal Impact Factor: 3.56
- 15) **A. Bile**, G. Bile, R. Pepino, H. Tari, *Innovative and non-invasive method for the diagnosis of dyschromatopsia and the re-education of the eyes*, Res. Biomed. Eng (2023). <https://doi.org/10.1007/s42600-023-00263-1>. Number of Citations: 1 Journal Impact Factor: 1.56

- 16) H. Tari, **A. Bile**, A. Nabizade, M. Iodice and E. Fazio, *Ultra-broadband interconnection between two SPP nanostrips by a photorefractive soliton waveguide*, Opt. Express 31, 26092-26103 (2023), <https://doi.org/10.1364/OE.489886>. Number of Citations: 12 Journal Impact Factor: 3.83
- 17) F. Frasca, E. Verticchio, A. Peiró-Vitoria, A. Grinde, **A. Bile**, C. Chimenti, C. Conati Barbaro, G. Favero, E. Fazio, F. Garcia-Diego, A.M. Siani, *Strategies for the use of microclimate sensors in spaces housing collections*, Heritage Science (2022), *Herit Sci* **10**, 200 (2022). <https://doi.org/10.1186/s40494-022-00831-1>. Number of Citations: 5 Journal Impact Factor: 2.84
- 18) **A. Bile**, H. Tari, A. Grinde, F. Frasca, A.M Siani, E. Fazio, *Novel model based on artificial neural networks to predict short-term temperature evolution in museum environment*, Sensors 22, 615 (2022) <https://doi.org/10.3390/s22020615>. Number of Citations: 24 Journal Impact Factor: 3.85
- 19) **A. Bile**, H. Tari, E. Fazio, *Episodic Memory and Information Recognition Using Solitonic Neural Networks Based on Photorefractive Plasticity*. Appl. Sci. 2022, 12, 5585, <https://doi.org/10.3390/app12115585>. Number of Citations: 15 Journal Impact Factor: 2.7
- 20) H. Tari, **A. Bile**, F. Moratti, E. Fazio, *Sigmoid Neuromorphic activation function for Surface Plasmon Polariton integrated circuits*, Plasmonics (2022) <https://doi.org/10.1007/s11468-021-01553-z>. Number of Citations: 1 Journal Impact Factor: 2.73
- 21) B. Ianero, **A. Bile**, M. Alonzo, E. Fazio, *Stigmergic electronic gates and networks*, in press on J. Computational Electronics **20**, 2614–2621 (2021). Number of Citations: 16 Journal Impact Factor: 1.98
- 22) **A. Bile**, F. Moratti, H. Tari, E. Fazio, *Supervised and unsupervised learning using a fully-plastic all-optical unit of artificial intelligence based on solitonic waveguides*, Neural Comput. C Applic. (2021). <https://doi.org/10.1007/s00521-021-06299-7>. Number of Citations: 18 Journal Impact Factor: 5.1
- 23) **A. Bile**, *Development of intellectual and scientific abilities through game- programming in Minecraft*. Educ Inf Technol (2022). <https://doi.org/10.1007/s10639-022-10894-z>. Number of Citations: 35 Journal Impact Factor: 1.13
- 24) **A. Bile**, R. Pepino, E. Fazio, *Study of magnetic switch for surface plasmon-polariton circuits*, AIP Advances 11, 045222 (2021). Number of Citations: 10 Journal Impact Factor: 1.7
- 25) F. Camponeschi, **A. Bile**, H. Tari, E. Fazio, *Plasmonic-Solitonic coupling structure*, Int. J. Sci. Eng. Appl. Sci. 7 (3), 162-167 (2021). Number of Citations: 7 Journal Impact Factor: N/A
- 26) M. Reza Majidi, H. Tari, **A. Bile**, E. Fazio, *Development of sol-gel based carbon ceramic electrode modified by graphene oxide - polypyrrole nanocomposite for simultaneous determination of uric acid and dopamine in presence of ascorbic acid*, Int. J. Sci. Eng. Appl. Sci. 7 (3), 162-167 (2021). Number of Citations: 0 Journal Impact Factor: N/A

Conference Proceedings:

- 1) **A. Bile**, H. Tari, R. Pepino, A. Nabizada and E. Fazio, *Solitonic Neural Network: A novel approach of photonic Artificial Intelligence based on photorefractive solitonic waveguides*, EPJ Web Conf, Volume 287 (2023), EOS Annual Meeting (EOSAM 2023), <https://doi.org/10.1051/epjconf/202328713003>
- 2) **A. Bile**, M. Centini, D. Ceneda, A. Passaseo, D.M. Tobaldi, V. Tasco, C. Sibilìa and M.C. Larcirpete, *Tuning mid-infrared polarization sensitive reflectivity in GaN/AlGaIn heterostructures*, EPJ Web Conf, Volume 287 (2023), EOS Annual Meeting (EOSAM 2023), <https://doi.org/10.1051/epjconf/202328714002>

- 3) H. Tari, **A. Bile**, A. Nabizada, R. Pepino and E. Fazio, *Realization of tunable ultrabroadband interconnection for solitonic-plasmonic synapsis by exploiting epsilon near zero conducting oxides*, EPJ Web Conf, Volume 287 (2023), EOS Annual Meeting (EOSAM 2023), <https://doi.org/10.1051/epjconf/202328713021>

Book chapters:

- 1) **A. Bile** (2025). Intelligent Learning: AI 's Impact on Early Educational Strategies. In AI in Early Education : Integrating Artificial Intelligence for Inclusive and Effective Learning. Wiley, <https://doi.org/10.1002/9781394352821.ch04>.
- 2) **A. Bile** (2024). Overview of Neuromorphic Optical Systems. In: Solitonic Neural Networks. Machine Intelligence for Materials Science. Springer, Cham. https://doi.org/10.1007/978-3-031-48655-5_2
- 3) **A. Bile** (2024). Towards Neuro-Learning Process: Pyschomemories. In: Solitonic Neural Networks. Machine Intelligence for Materials Science. Springer, Cham. https://doi.org/10.1007/978-3-031-48655-5_3
- 4) **A. Bile** (2024). Introduction to Neural Networks: Biological Neural Network. In: Solitonic Neural Networks. Machine Intelligence for Materials Science. Springer, Cham. https://doi.org/10.1007/978-3-031-48655-5_1
- 5) **A. Bile** (2024). Solitonic Neural Network Acting as an Episodic Memory. In: Solitonic Neural Networks. Machine Intelligence for Materials Science. Springer, Cham. https://doi.org/10.1007/978-3-031-48655-5_5
- 6) **A. Bile** (2024). The Solitonic X-Junction as a Photonic Neuron. In: Solitonic Neural Networks. Machine Intelligence for Materials Science. Springer, Cham. https://doi.org/10.1007/978-3-031-48655-5_4
- 7) E. Fazio, **A. Bile**, H. Tari (2022). Optical Soliton Neural Networks. In (Ed.), Artificial Neural Networks – Recent Advances, New Perspectives and Applications. IntechOpen. <https://doi.org/10.5772/intechopen.107927>.