Alessandro Bile

PROFESSIONAL EXPERIENCE

2022-2023	**Tutor** for DSA SLD and disabled Students at Sapienza University of Rome. **Tutor** for the Physics 1 (**FIS/**01) course at the University of Rome “Sapienza.
January 2022 - April 2022	**Visiting Researcher** at the Optics laboratory of the Femto-ST University of Besançon (France).
2021-2022	**Adjunct Professor** of "**Elements of Mathematical Analysis**" for the course of Technical Professions for Construction and the territory at the Sapienza University of Rome.
01 September 2021 - 31 August 2022	**Research fellowship** 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.
01 September 2019 - 31 August 2021	**Research fellowship** 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/

2019-2022	**PhD in Electromagnetism** on the research project " **Design, modeling and implementation of intelligent hardware structures in the domain of optics** " at the Department of Basic and Applied Sciences for Engineering at the University of Rome "Sapienza"
2021-2022	**Principal Investigator** on Education Research and Learning at the Digital Education Lab of Rome.
2019-2022	**Tutor** of Mathematical Analysis (MAT/05) at the University of Rome "Sapienza"
2019-2021	**Tutor** of Physics 1 (FIS/01) at the University of Rome "Sapienza"
2020-2021	**University mentor / tutor of Physics**, Mathematical Analysis, Computer Science and Programming at Camplus College Rome.
2019-2022	**Tutor** of Mathematical Analysis (MAT/05) at the University of Rome "Sapienza"
2019-2021	**Tutor** of Physics 1 (FIS/01) at the University of Rome "Sapienza"
2020-2021	**University mentor / tutor of Physics**, Mathematical Analysis, Computer Science and Programming at Camplus College Bologna.
2020-2022	**Mentor** at Digital Education Lab: https://www.digitaleducationlab.it/perche-scuola-educazione-digitale/il-team/ **Founder and designer of the Coding and Music course**.
2019	**Exerciser** for Prof.ssa Pia Astone for the Physics course at the Faculty of Pharmacy at the University of Rome "Sapienza".
2016-2021	Private lessons of Piano and Electronic Music.

2012-2021	Private lessons of Maths and Physics for University and high school students.
2018	Participation in the "Opus" Concert as a **Film Artist** at the Roman Philharmonic Academy in Rome.
2018	Participation in the concert "Many Lands: One voice" as **Film Artist** at the Symphony space theater in New York
2017	Participation in the “Fuse” Concert as **Film Artist** at Di Menna Center in New York.

REVIEWER, PROGRAM COMMITTEE MEMBER

2022

Committee Member for the following conferences:

- **Scientific Committee Member:** CMPmeet2022, Munich, Germany.

- **Program Committee Member:** *International Conference on Neural Computing for Advanced Applications* (NCAA), Jian, China.

- **Program Committe Member** and **Chairman:** International Conference on Smart Education, Health and ICT (SHI 2022), Cambridge, United Kingdom.

2021-2022

Reviewer of scientific papers, for the following journals:
- *Cognitive Neurodynamics*
- *Technology, Knowledge and Learning.*

2021-2022	**Reviewer of scientific papers**, for the following conferences: - *International Conference on Neural Computing for Advanced Applications (NCAA 2022), Jian, China,* https://dl2link.com/ncaa2022/organization/programCommittee/. - *Fuzzy Systems and Data Mining (FSDM 2022), Xiamen City, China.* - *International Conference on Machine Learning and Intelligent Systems* (MLIS2022), Seoul, Republic of Korea.

FUNDING, AWARDS AND ACKNOWLEDGMENTS

23 February 2022	**Alda Merini Prize**: awarded by the Nuova Accademia dei Bronzi for opera “Sospeso tra indefinito e rivelato”.
21 February 2022	**Awarded** by the **Communic-azione! 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.
23 January 2021	**Research Grant: avvio alla ricerca**, funding for young researchers. **Project title**: *Study of complex photonic neural networks built through the use of soliton guides.* **Reference**: AR12117A814F8BCA
18 November 2021	**Research grant** awarded by the French government (**BGF**) to conduct three months of research activities in France. https://www.institutfrancais.it/italia/borse-del-governo-francese-0

16 November 2020

Research Grant: avvio alla ricerca, 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.
Reference: AR120172B7152382

BOOK PUBLICATIONS

2022

E. Fazio, **A. Bile**, H. Tari, *Optical Soliton Neural Networks,* Book Chapter in Artificial Neural Networks - Recent Advances, New Perspectives and Applications at Intechopen Editor, submitted.

ARTICLE PUBLICATIONS

2022

Bile, A., Tari, H., Fazio, E., *Episodic Memory and Information Recognition Using Solitonic Neural Networks Based on Photorefractive Plasticity*. Appl. Sci. 2022, 12, 5585. https://doi.org/10.3390/app12115585

2022

Bile, A., Tari, H., Grinde, A., Frasca, F., Siani, A.M., Fazio, E., *Novel model based on artificial neural networks to predict short-term temperature evolution in museum environment, Sensors,* 2022; 22(2):615. https://doi.org/10.3390/s22020615.

2022

Bile, A. *Development of intellectual and scientific abilities through game-programming in Minecraft*. *Educ Inf Technol* (2022). https://doi.org/10.1007/s10639-022-10894-z

2021 **Bile, A.,** Moratti, F., Tari, H., Fazio, E., *Supervised and unsupervised learning using a fully-plastic all-optical unit of artificial intelligence based on solitonic waveguides*. Neural Comput & Applic 33, 17071–17079 (2021)**.** *https://doi.org/10.1007/s00521-021-06299-7*

2021 **Bile, A.,** Pepino, R., Fazio, E., *Study of Magnetic Switch for Surface Plasmon Polariton Circuits,* AIP Advances (2021), Volume 11, issue 4. https://doi.org/10.1063/5.0040674

2021 B. Ianero, **A. Bile**, M. Alonzo, E. Fazio, *Stigmergic Electronic Gates and Networks,* J Comput Electron (2021). *https://doi.org/10.1007/s10825-021-01799-0*.

2021 Tari, H., **Bile, A**., Moratti, F. et al. Sigmoid Type Neuromorphic Activation Function Based on Saturable Absorption Behavior of Graphene / PMMA Composite for Intensity Modulation of Surface Plasmon Polariton Signals. Plasmonics (2022). *https://doi.org/10.1007/s11468-021-01553-z*

2021 M. Majidi, H. Tari, **A. Bile**, E. Fazio, *Development of sol-gel based carbon ceramic electrode modified by graphene oxide - polyporrole nano composite for simultaneous determination of uric acid and dopamine in presence of ascorbic acid,* International Journal of Scientific Engineering and Applied Science, Volume 7, issue 4 (221-222), 2021.

2021 F. Camponeschi, **A. Bile**, H. Tari, E. Fazio, *Plasmonic-Solitonic coupling structure,* International Journal of Scientific Engineering and Applied Science, Volume 7, issue 3 (162-167), 2021, ISSN: 2395-3470.

2021	**A. Bile**, G. Nicita, D. De Vito, Analysis of transversal skills acquired though game-learning, FabLearn Conference proceedings 2021, INDIRE.

Papers under Review

2022	**A. Bile**, M. Chauvet, H. Tari, E. Fazio, *Supervised Learning of soliton X-Junctions in Lithium Niobate films On Insulator*, submitted.
2022	**A. Bile**, M. Chauvet, H. Tari, E. Fazio, *All-optical erasing of photorefractive solitonic channels in Lithium Niobate thin film*s, submitted.

Papers in preparation

2022	**A. Bile**, *Analysis of scientific skills acquired in primary age through Minecraft Education*, in preapration.
2022	Tari, H., **Bile, A.**, Nabizadeh, A., Iodice, M., Fazio, E., *Addressable hybrid Plasmonic-Solitonic interconnection*, in preparation.
2022	**A. Bile**, R. Santoboni, S. Frasca, P. Astone,*Gravitational Music,* in preparation.
2022	**A. Bile,** P. Citera, N. Bernardini, Study on rhythm recognition in neuronal dynamic through simple and complex patterns, in preparation.
2022	**A. Bile,** R. Pepino, H. Tari, *Innovative non-invasive method for the diagnosis of dyschromatopsia*, in preparatio.

SCIENTIFIC CONFERENCES

September 2022	E. Fazio, **A.Bile**, H. Tari, *Neural networking and machine learning based on photorefractive solitonic waveguides: novel all-plastic Photonic Artificial Intelligence*, Photorefractive Photonics and Beyond 2022, Monastier di Treviso (Italy).
September 2022	H. Tari, **A. Bile,** M. Iodice, E. Fazio, *Photorefractive soliton synapsis for Surface-Plasmon-Polariton circuits,Photorefractive Photonics and Beyond 2022, Monastier di Treviso (Italy)*
September 2022	**A. Bile,** M. Chauvet, F. Bassignot, L. Gauthier-Manuel, H. Tari, E. Fazio, *Addressable and erasable photonic neurons using solitonic X-Junctions in lithium niobite films,* Photorefractive Photonics and Beyond 2022, Monastier di Treviso (Italy).
August 2022	E. Fazio, **A. Bile**, H. Tari, *Stigmergic reinforcement learning in photonic neural networks based on solitonic waveguides*, AI and Machine Learning, Budapest (Hungary).
July 2022	M. Chauvet, A. Perin, **A. Bile**, F. Bassignot, L. Gauthier-Manuel, E. Fazio, *Films De $LiNbO_3$: a plateforme pour fonctions optiques photo induites*, OPTIQUE NICE 2022, Nice (France).
June 2022	**A.Bile**, H. Tari, E. Fazio, Solitonic nueormorphic hardware for episodic pattern recognition and memorization, ICOP 2022, Trento (Italy).
May 2022	**A. Bile**, H.Tari, E. Fazio, *Development of an episodic neural network model using spatial solitons, CMPMEET2022* International meet on condensed matter physics, Munich (Germany). **Invited Speaker.**

March 2022	**A. Bile**, H. Tari, E. Fazio, *Solitonic neuromorphic hardware for pattern recognition and episodic memorization,* Euro Optics 2022, Rome (Italy).
February 2022	**A. Bile**, F. Frasca, E. Verticchio, E. Fazio, G. Favero, C. Chimenti,, A. Grinde , A.M. Siani, *Novel approach based on machine learning techniques to predict the microclimate variables inside museums*, at the 4th congress of AISAM - Italian Association of Atmospheric Sciences and Meteorology, University of Milano, Italy. **Speaker.**
February 2022	F. Frasca, E. Verticchio , **A. Bile**, E. Fazio, G. Favero, C. Chimenti, A. Vulpiani, A. Grinde , A.M. Siani, *Approaches to analyze the indoor climate in historical buildings*, at the 4th congress of AISAM - Italian Association of Atmospheric Sciences and Meteorology, University of Milano, Italy.
December 2021	**A.Bile**, G. Nicita, D. De Vito, *Analysis of transversal skills acquired though game-learning,* FabLearn Conference 2021, INDIRE, Virtual Conference. **Speaker.**
December 2021	**A. Bile,** F. Frasca, A.M. Siani, E. Verticchio, E. Fazio, *Prediction of the microclimate through NAR and NARX neural networks: application to Rosenborg Castle, museum partner of the CollectionCare project*, CollectionCare Conference, Valencia, Spain. **Plenary Speaker.**

December 2021	F. Frasca, E. Verticchio, **A. Bile,** E. Fazio, G. Favero, C. Chimenti, C. Conati Barbaro, A. Vulpiani, S. Lupi, A. Grinde, B. Escobar Soca, M. Zarzo, P. Merello, F.J. García-Diego, A.M. Siani, *Changing track in procedures for deploying microclimate sensor* devices in museum environments: *application to CollectionCare museums, CollectionCare Conference*, Valencia, Spain.
September 2021	E. Fazio, **A.Bile**, H. Tari, *Experimenting with optical plasticity in photonic machine learning - towards all-optical Artificial Intelligence,* EOSAM 2021, Rome, Italy.
February 2021	F. Frasca, E. Verticchio , **A. Bile,** E. Fazio, G. Favero, C. Chimenti, A. Vulpiani, A. Grinde , A.M. Siani, *Definition of allowable targets from indoor climate observations in exhibition rooms: the case study of the Rosenborg Castle (Denmark) Analysis of the indoor climate trends in exhibition rooms: the case study of the Rosenborg Castle (Denmark),* at the 3rd congress of AISAM - Italian Association of Atmospheric Sciences and Meteorology, University of L'Aquila, Italy.
September 2020	**A. Bile**, F. Moratti, E. Fazio, *Photonic implementation of an elementary unit of artificial intelligence based on solitonic waveguides*, Orale presso ICOP2020 Italian Optics and Photonics Conference, all'Università di Parma, Italia. **Speaker.**

September 2020	H. Tari, **A. Bile**, F. Moratti, E. Fazio, *Implementation of neuromorphic activation function within Surface Plasmon Polariton circuits,* presso ICOP2020 Italian Optics and Photonics Conference, all'Università di Parma, Italia.
September 2020	H. Tari, **A. Bile**, F. Moratti, E. Fazio, *Surface Plasmon Polariton neuromorphic circuit with sigmoid activation function,* presso 9th EPS-QEOD Europhoton, Czech Technical University, Praga, Repubblica Ceca.
January 2020	**Speaker** for the Rome Technical Meeting of the European Collection Care project with the title "Particulate Detectors to be used inside the Sensor Node".
July 2019	E. Fazio, M. Alonzo, A. Belardini, **A. Bile**, C. Soci, *Stigmergic reinforcement learning using All-Optical soltionic X-junctions*, paper 83, OμS'19.

SUPERVISOR ACADEMIC THESIS

January 2021	**Co-supervisor** of master's thesis in Electronic Engineering at the "Sapienza" University of Rome by candidate Federico Camponeschi Title of the work: "Hybrid plasmon-soliton nano-photonic interconnection".

December 2020	**Co-supervisor** of the bachelor thesis in Computer Engineering at the "Sapienza" University of Rome of the candidate Romolo D'Amico. Title of the work: "Development of a machine-learning system using LSTM networks for the analysis and predictions of historical data series".
October 2020	**Co-supervisor** of master's thesis in Nanotechnology Engineering at the "Sapienza" University of Rome of candidate Riccardo Pepino. Title of the work: "Study of a magnetic switch in circuits using surface plasmons-polaritons".
January 2020	**Co-supervisor** of master's thesis in Electronic Engineering at the "Sapienza" University of Rome of candidate Francesca Moratti. Title of the work: "Study of a neural photonic circuit".

HIGHER EDUCATION AND TRAINING

November 2021 - December 2023	**Master's Degree** in **Electronic Music** at the Conservatory of Rome Santa Cecilia.
July 2019	**DataScience certification**, paid postgraduate training course Experis Academy, Bergamo.
24 January 2019	**Master's degree** in **General Theoretical Physics** at the Sapienza University of Rome, with 110/110 cum laude. Thesis title: "Objects detection and tracking". Supervisors Prof. Pia Astone and Prof. Sergio Frasca.
24 March 2018	**Bachelor's degree** in **Electronic Music** with 110/110 evaluation at the Conservatory of Rome Santa Cecilia, with an experimental thesis entitled: "Gravitational Music".

17 October 2017	**National Diploma** 1st level Instructor, Personal Trainer.
2004-2017	Piano student at the “Sylvestro Ganassi” music school.
2013-2016	**Bachelor's degree in Physics** with 110/110 assessment at the "Sapienza" University of Rome. Thesis title: “Neutron capture therapy with boron”. Supervisor Prof. Riccardo Faccini.
2008-2013	**Classical high school diploma** with 100/100 evaluation at the Liceo Classico Terenzio Mamiani in Rome.

Certifications

20 February 2022	Mc Graw Hill Commercial French Certificate, with evaluation B (83%).
11 February 2022	Mc Graw Hill French Certificate B2, with evaluation A (93%).
05 February 2022	Mc Graw Hill French Certificate B1, with evaluation B- (80%).
13 January 2022	Mc Graw Hill French Certificate A2, with evaluation B (83%).
18 October 2021	Mc Graw Hill French Certificate A1, with evaluation C (75%).
30 January 2021	Deep Learning with Matlab offerto da MathWorks.
11 September 2020	Certification in Technological Translator, organized by the Mathematical Office for Innovation and Businesses of the CNR
22 February 2020	Certification 24 CFU per l’insegnamento

23 October 2019	Certification online "Basic 3D Modeling using Blender” offered by IIT Bombay University.
7-11 October 2019	Winner of the “15th Advanced School on Computer Graphics for Cultural Heritage”, organized by the Cineca office in Bologna. Course on "Computer Graphics and Deep Learning for Cultural Heritage" and achievement of the relative certification.
July 2019	Certificate "General training on the protection of health and safety at work" for attendance and for passing the final tests.
12 May 2019	EF test certification with 74/100, C2, Proficient evaluation.
March-April 2019	“Machine Learning” online certification Stanford University course.
25 August 2018	“Deep Learning Onramp” online certification, course offered by Mathworks Matlab.
2017-2018	Participation in Philosophy lessons with attached certificates at the Philosophy Festival of Modena, Carpi, Sassuolo.

PERSONAL SKILLS

Mother tongue: Italian

Other languages

	UNDERSTANDING		SPOKEN SKILL		WRITTEN PRODUCTION
	Listening	Reading	Interaction	Oral Production	
English	C1	C2	C2	C1	C2
Spanish	A2	B1	A1	A1	B1

French	B2	B2	B1	B1	A2

Communication skills

- Good communication skills acquired during the assignments of private lessons, held since 2012, and as a porter at the condominium "Le Rocchigiane" located in Rocca di Mezzo (AQ) in 2013.

Organizational and management skills

- Good organizational and management skills obtained while serving as departmental representative at the Santa Cecilia Music Conservatory and as a representative of doctoral students at the Department of Basic and Applied Sciences for Engineering in Rome.

Digital Skills

AUTOVALUTAZIONE

Information processing	Communication	Content Creation	Safety	Problem solving
Expert user	Expert user	Expert user	Expert user	EXPERT USER

- Professional skills of didactic tools for remote lessons, tutoring, exams. Professional knowledge of Exam.net, SEB, Google Meet, Microsoft Teams and Zoom.
- Good skills of office suite tools (word processor, spreadsheet, presentation software)
- Good skills of digital sound processing programs acquired as a composer and sound engineer at the Santa Cecilia Conservatory of Music
- Good skills of programs for digital image and video processing acquired as a film artist and video maker
- Skills in Data Base- SqlServer TSql, Cloud- Azure, PowerBI, R language, Supervised Machine Learning, Unsupervised Machine Learning, Clustering & Recommendation, Predictive Maintenance, Azure Machine Learning, Big data with RevoScaleR, Python language, Deep Learning Computer vision, Time Series Classic and Deep Learning, Reinforcement learning, Analyzing Big data with Databricks
- Skills in Graphics Comptuer: Blender
- Deep Learning Skills for Cultural Heritage

Programming Languages

- In-depth knowledge of C, Matlab, R, COMSOL and Octave, Python
- Good knowledge of Python, Processing, Max-Msp, PureData, Scratch
- Basic knowledge of PERL

Other Skills

- Film Artist
- Composer
- Private teacher
- Swimming: experienced swimmer, currently a member of the Master team of the Due Ponti Sporting Club, finisher of the iron master swimming and 2nd position in 200 m butterfly at 2021 Italian Swimming Master Championship.
- Ski: expert skier, former member of the Campo Felice Ski Club

Privacy

I authorize the processing of my personal data pursuant to Legislative Decree 30 June 2003, n. 196 "Code regarding the protection of personal data".