**INFORMAZIONI PERSONALI**

Nome

# Alessandro Bile

**ESPERIENZA LAVORATIVA**

• Date (da – a)

**Academic Years Institution Lecture/Course**
**2023-2024** Sapienza Università di Roma **Physics 1 (FIS/01)** Civil and Ambiental Engineering course
(Bachelor's Degree) (CIVIL AND ENVIRONMENTAL ENG.)
**2023-2024** Sapienza Università di Roma **Medical Physics (FIS/07)** for the Medicine and Psychology - Medical
and Surgical Sciences and Translational Medicine Orthopedic
Techniques - Rome Azienda Ospedaliera Sant'Andrea.
**2023-2024** Sapienza Università di Roma **Fundamentals of mechanics – physics (FIS/07)** for the Medicine
and Psychology - Medical and Surgical Sciences and Translational
Medicine Orthopedic Techniques - Rome Azienda Ospedaliera
Sant'Andrea.
**2023-2024** Sapienza Università di Roma **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.
**2022-2023** Sapienza Università di Roma **Fundamentals of mechanics – physics (FIS/07)** for the Medicine
and Psychology - Medical and Surgical Sciences and Translational
Medicine Orthopedic Techniques - Rome Azienda Ospedaliera
Sant'Andrea.
**2022-2023** Sapienza Università di Roma **Complementary Mathematics (MAT / 04)** for Techniques of
prevention in the environment and in the workplace (Bachelor's
Degree) (health profession of prevention technician in the
environment and in the workplace)
**2023** Sapienza Università di Roma **Orientamento in Rete - Physics (FIS/01),** Faculty of Medicine and
Psychology, Sapienza University of Rome.
**2021-2022** Sapienza Università di Roma **Mathematical Analysis (MAT/05)** for Technical Professions for
Construction and the Territory course (Bachelor's Degree) (CIVIL
*AND ENVIRONMENTAL ENG.)*

• Nome e indirizzo del datore di lavoro

**High School Courses Academic Years Institution Lecture/Course**
**2022** Liceo Classico Visconti di Roma
*Mathematics and Physics*

| • Tipo di azienda o settore | **Academic Appointments** |
|---|---|

**START END INSTITUTION POSITION**

**1 March 2023 – 29 February 2024**

Sapienza Università di Roma (Italy) **Research fellowship** 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.

**1 March 2023 – 29 February 2024**

Sapienza Università di Roma (Italy) **Research fellowship** 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.

**1 November 2022 – 28 February 2023**

Università di Torino (Italy) **Research fellowship** 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.

**24 January 2022 - 24 April 2022**

Femto-ST Institut (FR) **Research fellowship from BGF** related to the experimental demonstration of "Solitonic XJunction in Lithium Niobate On Insulator".

**1 September 2021 - 31 August 2022**

Sapienza Università di Roma (Italy) **Research fellowship** related to the research project "*Intelligent optical systems for recognition and sanification of pathological micro- and nanoorganisms*" at the Department of Basic and Applied Sciences for Engineering of the University of Rome "Sapienza", with scientific director Prof. Eugenio Fazio.

**12 September 2022 – 31 October 2022**

Sapienza Università di Roma (Italy) **Physics and Mathematics Professor** at "Liceo Ginnasio Statale Visconti", High School in Rome.

**2019 2021** Sapienza Università di Roma (Italy) **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 /

**2021 2022** Sapienza Università di Roma *Lecturer* (**Professore a Contratto**) of Elements of Mathematical Analysis, Technical Professions for Construction and the Territory (Civil and Industrial Engineering).

**2021 2022** Digital Education Lab **Principal Investigator** on Education Research methods.

**2019 2022** Sapienza Università di Roma **Tutor** of Physics 1 (FIS/01) for the course in Civil Engineering.

**2019 2022** Sapienza Università di Roma **Tutor** of Mathematical Analysis (MAT/05) for the course in Civil Engineering.

**2019 2021** Camplus College di Roma **Mentor** for the courses of Physics 1, Physics 2, Mathematical Analysis, Programming.

**2020 2021** Camplus College di Bologna **Mentor** for the courses of Physics 1, Physics 2, Mathematical Analysis, Programming.

**2020 2022** Digital Education Lab **Mentor and Founder** of the course Music and Code.

**2012 2018** Sapienza Università di Roma Representative of the PhD Students at the Collegium of *Electromagnetism, Nanoscience and Mathematical Models for Engineering*

## ISTRUZIONE E FORMAZIONE

**Date (da – a)**

**Master degree** 2021-2023 Conservatorio di
Roma Santa Cecilia
**Master's degree** in Electronic Music.
**Dottorato-PhD** 2019-2022 Università degli Studi
di Roma La Sapienza
**PhD in Electromagnetism.** Thesis:" Solitonic Neural
Network: Development of an innovative photonic
neural network based on solitonic plastic
interconnections". Special **Mention Doctor
Europaeus** awarded by Sapienza University of Rome.
**Post-laurea training** 2021 CNR Certification in Technological Translator, organized
by the Mathematical Office for Innovation and
Businesses of the CNR
**24 CFU Post-laurea
training**
2020-2021 Sapienza 24 CFU Teaching Certification
**Post-laurea training** 2019 Experis Academy di
Bergamo (ITA)
Data Science Certification
**Master degree** 2016-2018 Università degli Studi
di Roma La Sapienza
**Master's degree in Physics (110/110 cum Laude)**.
Thesis: "Objects detection and tracking".
**Bachelor degree** 2014-2017 Conservatorio di
Roma Santa Cecilia
**Bachelor's degree in Electronic Music (110/110).**
Thesis: "Gravitational Music".
**Bachelor degree** 2013-2016 Università degli Studi
di Roma La Sapienza
**Bachelor's degree in Physics (110/110).** Thesis:
"BNCT: boron neutron capture therapy".
**under-graduate** 2013 Liceo Classico
Terenzio Mamiani
**Maturità Classica – Classical Bachelor Licence
(100/100)**

## CAPACITÀ E COMPETENZE PERSONALI

*Acquisite nel corso della vita e della carriera ma non necessariamente riconosciute da certificati e diplomi ufficiali*.

**MADRELINGUA**

Italian

**ALTRE LINGUA**

| | | | |
|---|---|---|---|
| • Capacità di lettura | English | C2 C2 C2 |
| • Capacità di scrittura | French | B2 B1 B1 |
| • Capacità di espressione orale | Spanish | A2 A1 A1 |

| | |
|---|---|
| **CAPACITÀ E COMPETENZE TECNICHE**<br>*Con computer, attrezzature specifiche, macchinari, ecc.* | Matlab Professional<br>COMSOL Professional<br>Python Good Knowledge<br>C Good Knowledge<br>Fortran Good Knowledge<br>Octave Professional<br>R Good Knowledge<br>Max-MSP, PureData Good Knowledge<br>Scratch Good Knowledge<br>Perl Basic<br>Blender Basic<br>Professional skills of didactic tools for remote lessons, tutoring and exams. Professional knowledge of<br>Exam.net, Safe Exam Browser (SEB), Google Meet, Zoom and Microsoft Teams.<br>Professional knowledge of the Office package |
| **CAPACITÀ E COMPETENZE ARTISTICHE**<br>*Musica, scrittura, disegno ecc.* | **Music Composer at the following Concerts:**<br>**Date Place Concert**<br>June-2017 New York Participation in the "Fuse" Concert as Film Artist at Di Menna Center<br>June-2018 New York<br>Participation in the "Many Lands" Concert as Film Artist at Symphony Space Theatre.<br>July-2018 Rome<br>Participation in the "Opus" Concert as a Film Artist at the Roman Philharmonic Academy. |

## Awards and Honors

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

21/02/2012 **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](http://congresso.aisam.eu/comunic-azione-.html)

### Summary of all research activities

*Main Research Activity: Photonic Hardware Artificial Intelligence*

My main research work is focused on photonic hardware for the implementation of intelligent systems. The technological means used is the spatial soliton. Soliton waveguides exhibit a plastic behavior by their nature, that is, a modifiable behavior. The refractive index contrast of a soliton guide depends on the intensity of the light used to write it: therefore, by modulating the intensity of the light sent, it is possible to increase or decrease this contrast, giving neuroplasticity to the system. For this reason, the natural evolution of soliton integrated systems is in learning networks or neural networks. This process is typical of biological neural systems. Like them, soliton neural networks (SNNs), made by the interconnection of fundamental structures that are X-junction neurons, are able to learn information and store it in specific neural pathways through changes in the refractive index.

*Software Artificial Intelligence for Microclimate prediction in Museums Educational Models for learning transversal skills*

At the same time, I use software neural networks, Machine Learning and Deep Learning, for the creation of devices capable of predicting microclimatic fluctuations inside museums. The models used can be used to safeguard the works of art and to improve the quality of visitors' well-being as well as lower maintenance and management costs*.* In recent years I have been interested in the cognitive processes through which the learning of complex concepts that allow the interconnection between cognitive areas takes place. Observing how the playful dimension plays a decisive role, I approached the analysis of educational models based on game-learning, observing how children who learn in this way are able to obtain a faster and more effective learning, even of abstract concepts.

Roma, Dicembre 03, 2023

*Pagina 5 - Curriculum vitae di [ COGNOME, gnome ]*

Per ulteriori informazioni:
www.cedefop.eu.int/transparency
www.europa.eu.int/comm/education/index_it.html
www.eurescv-search.com