Curriculum Vitae

Tiago David da Silva Ferreira



General Information

Name Tiago David da Silva Ferreira

Date of Birth February 16th, 1995 (31 years old)

Nationality Portuguese

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Academic Degrees

2019 - 2024 **PhD in Physics**

Supervisor: Professor Doctor Ariel Guerreiro Co-supervisors: Dr. Nuno A. Silva and Dr. Daniele Faccio. PhD thesis

Universidade do Porto, Faculdade de Ciências, Portugal

2013 - 2018 **Integrated Master's Degree in Engineering Physics**

Classification 17 out of 20

Supervisor: Professor Ariel Guerreiro; Co-supervisor: Dr. Nuno A. Silva. MSc thesis

Universidade do Porto, Faculdade de Ciências, Portugal

2013 - 2016 **BSc in Technological Physics**

Classification 17 out of 20

Prize "Professor Doutor Moreira de Araújo" - awarded to the best graduating student of the BSc in Physics in 2016.

Universidade do Porto, Faculdade de Ciências, Portugal

Additional Courses

2022 **Advanced Study Course on Optical Chemical Sensors (ASCOS)**

University Centre Obergurgl, Austria

Learned about optical sensors, chemical sensors, and biosensors. During that week, I participated in a challenge focused on the development of an optical sensor to sense methane leaks in closed environments. Our solution was awarded the first prize.

Work Experience

4/2026 to Present **Junior Researcher - CEEC**

INESC TEC – Center for Applied Photonics (CAP)

Experimental research in quantum imaging, photonic information processing and analogue quantum simulation; coordination of research projects; supervision and training of students; development of international collaborations; and preparation of national and European funding proposals.

7/2024 to 3/2026 **Post Doc Assistant Researcher**

INESC TEC – Center for Applied Photonics

Worked in paraxial fluids of light, optical information processing and quantum technologies, including the development of Hanbury Brown–Twiss (HBT) and Hong–Ou–Mandel (HOM) platforms, quantum imaging with undetected photons and Fisher-information-based optical sensing.

3/2023 to 5/2023 **Visiting Researcher**

Quantum Fluid of Light Lab Team, Kastler Brossel Laboratory, Paris, France

Worked at Quantum Fluid of Light Lab on paraxial fluids of light with hot atomic vapors. The goal was to probe the superfluid transition along the vapor cell. During my stay, I had the opportunity to learn about the fundamentals and experimental details of hot atomic vapors and techniques for probing the dispersion relation. This collaboration resulted in a co-authored publication in Physical Review Letters, a further manuscript under review, and a bilateral FCT-funded research project as a Principal Investigator.

2020-2021 **Invited Assistant Professor – Faculty of Sciences of the University of Porto**

Faculdade de Ciências da Universidade do Porto

Physics Laboratory I and Physics Laboratory III.

1/2019 to 12/2019 **Assistant Researcher**

INESC TEC – Center for Applied Photonics

Developed high-performance solvers based on GPGPU supercomputing with C++ and Python to study the interaction of light with quantum many-body systems and studied their application for developing optical nanosensors and exploring optical analogues.

2016-2017 **PEEC - Extra-Curricular Internship Program: Sensors and Nanometric Actuators based on magnetostrictive Materials**

IFIMUP, Porto

Simulation work on COMSOL combined with some experimental development for evaluating the model.

Grants

2026 - 2029 **Junior Researcher Grant**

Individual Call to Scientific Employment Stimulus - 7th Edition

2024.10684.CEECIND

2019 - 2024 **FCT Doctoral Grant**

SFRH/BD/145119/2019

Academic Prizes

2016 **Prize Professor Doutor Moreira de Araújo**

For the best student to graduate in Physics in 2016

Universidade do Porto, Faculdade de Ciências, Portugal

1. *Scientific Merit*

1.1 Scientific Production

1.1.A Publications

In the last five years, my scientific production has increased substantially, with publications in journals including Physical Review Letters, Physical Review A, New Journal of Physics, APL Photonics, Optics Letters and Scientific Reports. Ten representative publications have been selected to illustrate the main research directions of my scientific activity and their relevance to the present call. A complete publication record is provided in the annex.

Overview

Publications	
Peer-reviewed Scientific Journals	22 (+4 papers under review)
Peer-reviewed Proceedings	29 (4 to be published)

> Conference Communications *	
Oral communication (International)	22 (7 as presenting author, 1 invited)
Poster Communication (International)	28
Oral Communication (National)	15
Poster Communication (National)	25

*Including communications both as first author or member of the team

Online Publications Record

https://orcid.org/0000-0002-1318-4940
https://scholar.google.com/citations?user=KC2nhzEAAAAJ&hl=pt-PT

10 Selected Publications relevant to the call

Photonic information processing and computing

(Experimental and theoretical works exploring optical computing with complex and nonlinear media, including the potential for low-photon-number operation, providing a foundation for the development of programmable quantum photonic systems.)

- ★ Rocha, V., Silva, D., Moreira, F. C., Monteiro, C. S., Ferreira, T. D., & Silva, N. A. (2026). Probing a theoretical framework for a photonic extreme learning machine. New Journal of Physics, 28(6), 064101.
- Silva, N. A., Rocha, V., & Ferreira, T. D. (2024). Optical extreme learning machines with atomic vapors. Atoms, 12(2), 10.
- Silva, Nuno Azevedo, Tiago D. Ferreira, and Ariel Guerreiro. "Reservoir computing with solitons." New Journal of Physics 23.2 (2021): 023013.

Quantum Imaging and Metrology

(Experimental works demonstrating our group's capabilities in quantum technologies, from Fisher-information-based metrology to quantum imaging with Hong–Ou–Mandel interference)

- ★ Monteiro, Catarina S., Tiago D. Ferreira, and Nuno A. Silva. "High-precision acoustic event monitoring in single-mode fibers using Fisher information." Optics Letters 50.19 (2025): 6117-6120.
- ★ Gonçalves, C. R., Ferreira, T. D., Monteiro, C. S., & Silva, N. A. (2026). Quantum imaging of the fast-axis angle using Hong–Ou–Mandel interference. APL Photonics, 11(6), 060801.

Analogue quantum simulation with paraxial fluids of light

(Non-exhaustive selection of experimental works that present the unique capabilities of our paraxial-fluid platform for analogue quantum simulation as well as works with international teams on the same topic)

- ★ Ferreira, Tiago D., Ariel Guerreiro, and Nuno A. Silva. "Digital Feedback Loop in Paraxial Fluids of Light: A Gate to New Phenomena in Analog Physical Simulations." Physical Review Letters 133.24 (2024): 243802.
- Ferreira, Tiago D., Jakub Garwoła, and Nuno A. Silva. "Exploring the dynamics of the Kelvin-Helmholtz instability in paraxial fluids of light." Physical Review A 109, no. 4 (2024): 043704.
- Ferreira, Tiago D., Vicente Rocha, Duarte Silva, Ariel Guerreiro, and Nuno A. Silva. "Towards the experimental observation of turbulent regimes and the associated energy cascades with paraxial fluids of light." New Journal of Physics 24, no. 11 (2022): 113050.
- ★ Baker-Rasooli, M., Aladjidi, T., Ferreira, T. D., Bramati, A., Albert, M., Larré, P. É., & Glorieux, Q. (2026). Swimming against a superfluid flow: Self-propulsion via vortex-antivortex shedding in a quantum fluid of light. Physical Review Letters, 136(22), 223401.
- Tiago D. Ferreira, Nuno A. Silva, and Ariel Guerreiro (2018). Superfluidity of light in nematic liquid crystals. Physical Review A, 98(2). doi:10.1103/physreva.98.023825.

★ Publication submitted among the five works selected for this application. See the accompanying document for the justification of this selection.

1.1.B Technologies, Prototypes, and patents

This section highlights technologies and experimental prototypes developed across optical sensing, quantum imaging and analogue quantum simulation, demonstrating my contribution to the development of functional experimental platforms in addition to scientific publications.

Technologies and Patents

2025 **Speckle ID**

Hardware and software solution to detect multiple deformations / acoustic signals along a multimode optical fiber using event-based speckle interrogation and AI.
Patent under evaluation - P2022.6 EP | NPAT594/2025
(Developer, 10%)

2024 **Multilayer Optical Interface**

published international patent application WO 2024/003780 A1 (2024). Named co-inventor; developed in collaboration with the project team.
(Developer, 5%)

Relevant Experimental Prototypes

2026 **Quantum Imaging with Undetected Photons**

An experimental prototype that uses undetected photons to image in the infrared (1100nm-2300nm) using conventional CMOS cameras
(Creator, 90%)

2025 **HOM-based Quantum Microscope**

Polarization-sensitive HOM microscope for birefringence imaging using single-photon coincidence measurements. (https://pubs.aip.org/aip/app/article/11/6/060801/3394145)
(Creator, 60%)

2024 **NextGenPFL**

Experimental platform for analogue simulation of quantum-fluid dynamics using photorefractive nonlinear media and programmable wavefront shaping, with ongoing developments towards topological phenomena and quantum-matter emulation.
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.133.243802
(Creator, 50%)

1.2 Scientific Projects

In this section, I summarize my participation in competitively funded projects, including my role, coordination responsibilities and funding obtained.

Projects

The following table summarizes competitively funded project proposals to which I contributed directly, highlighting my responsibilities in proposal preparation, scientific coordination and funding acquisition.

Total of Successful Project Submissions with direct contribution to the application	3
As PI	2
Funding associated with successful proposals with direct contribution	475k€
Total Funds as PI	65k€

The funding summary includes only successful proposals in whose preparation I had a direct contribution. The following list also includes projects in which I participated as a researcher.

2026 - Present **PI**

HYPERQUIM - Hyperspectral Quantum Imaging with Undetected Photons

Funded by FCT as Exploratory project
Role: PI, coordinating tasks on the design and implementation of an optical setup for quantum imaging with undetected photons and a prototype to be used across diverse scenarios, from harsh environmental conditions to different types of samples.
(granted, started in January of 2026)

2026 - Present

QUAC - Quantum fluids of light for All-optical Computing

Funded by FCT as Exploratory project
Role: Participant, contributing to the coordination of experimental implementation, testing and validation.

2024 - Present **PI**

Next generation of paraxial fluids of light for versatile analogue quantum simulators

Funded by FCT as a bilateral project with Kastler-Brossel Laboratory at University of Sorbonne, Paris, France
Role: PI, coordinating scientific missions and collaborative experimental work with Quentin Glorieux on the topic of Quantum Fluids of Light.

2024 - Present

LIBScan – Desenvolvimento de um espetrómetro transportável LIBS com mapeamento rápido

Funded by ANI and COMPETE 2030 – Co-Promoção
Role: Participant, contributing to the experimental implementation of a galvo-scanning system for LIBS.

2022 - 2026

Health From Portugal

PRR, Funded by EU under the NextGenerationEU
Role: Participant, worked on tasks related to the development of interferometric-based sensors for optically trapped particles, and fusion with Raman spectroscopy data.

2023 - 2025

QuantELM - from Ultrafast optical processors to Quantum Extreme Learning Machines with integrated optics

Funded under the Internal Seed Projects Program by INESC TEC
Role: Participant, worked on tasks related to the implementation of optical setups based on the extreme learning machine paradigm.

2020 - 2023

Quantum Fluids of Light with Hot atomic vapors

Funded under the Program for Cooperation in Science between Portugal and Serbia by Fundação para a Ciência e Tecnologia. Partners: I.P. Belgrade
Role: Participant, worked on the experimental setup at INESC TEC – CAP and on a scientific mission to the international partners.

2020 - 2022 **LightBrain - a light speed neuromorphic chip with quantum fluids of light**

Funded under the Internal Seed Projects Program by INESC TEC
Role: Participant, worked on the development of an experimental platform for paraxial fluids of light at INESC TEC – CAP.

2019 - 2022 **GreenNanoSensing - Quantum nanoSensing for renewable energy and environmental management**

Funded by Fundação para a Ciência e Tecnologia
Role: Development of computing tools for the simulation of optical properties of plasmonic sensors for hydrogen detection.

1.3 Scientific Teams

In the last few years, I have been contributing to the coordination and management of the quantum imaging, optical computing and paraxial-fluids-of-light laboratories, part of the QUANTOS team at Center for Applied Photonics at INESC TEC (https://quantos.inesctec.pt/) which now supports the work of 3 PhD students, as well as master and international students from the QUARMEN master's program. These laboratories include state-of-the-art experimental platforms that have supported publications in high-impact journals, competitive project proposals, international collaborations and the training of MSc and PhD students. In this section I present evidence to illustrate my strengths in this regard, including supervisions and network of ongoing collaborations.

1.3.A Supervisions

I currently co-supervise three PhD students, have co-supervised one MSc thesis, and have supervised or co-supervised six MSc-level QUARMEN research internships, demonstrating my growing commitment to student training and supervision.

PHD STUDENTS (SUPERVISION)

Present Carolina Gonçalves, Doctoral Program in Physics Engineering, U. Porto, *Quantum Technologies for Next Generation of Hyperspectral Imaging;*
Co-Supervisor
*(*Since September 2025, FCT grant)

Tomás Lopes, Doctoral Program in Physics Engineering, U. Porto, *Laser induced breakdown spectroscopy: Innovative software tools to bridge the gap between science and technology;*
Co-Supervisor
(Since September 2023, FCT grant)

Vicente Rocha, Doctoral Program in Physics MAP-fis; U. Porto, *Harnessing optical neuromorphic architectures towards accessible and transparent high-performance computing hardware;*
Co-Supervisor
(Since September 2023, initially funded by PRR – Health From Portugal and now by an FCT grant)

MASTER STUDENTS (CO-SUPERVISION)

2025 Carolina Gonçalves, Master Degree in Physics, Harnessing Quantum Optical States for Sensing and Imaging Applications, Role: Co-Supervisor *(Classification 20/20)*

EXTERNAL MSC RESEARCH INTERNSHIPS (SUPERVISION)

2026 Alessandra Taurchini, Quarmen Program, Dynamics of a fluid of light in structured Moiré potentials – Experimental Setup, Research Internship, Supervisor

Emma Thonhauser, Quarmen Program, The Hong-Ou-Mandel Effect - Experimental Setup, Research Internship, Co-Supervisor

2025 Leelou Lefreve, Quarmen Program, Analogue Quantum Simulations with paraxial fluids of Light – Experimental Setup, Research Internship, Co-Supervisor

Andrea Del Torchio, Quarmen Program, Analogue Quantum Simulations with paraxial fluids of Light – Experimental Setup, Research Internship, Co-Supervisor

Marianna de Francesco, Quarmen Program, Analogue Quantum Simulations with paraxial fluids of Light – Turbulence and Superfluidity, Research Internship, Co-Supervisor

2023 Jakub Garwola, Quarmen Program, Analogue Quantum Simulations with paraxial fluids of Light, Research Internship, Co-Supervisor

1.3.B Scientific Collaborations

Finally, this section presents an overview of existing scientific collaborations to demonstrate international relevance and drive of our research lines.

Analogue Quantum Simulations

1. Quentin Glorieux, from University of Sorbonne (Quantum fluids of Light) – *Ongoing collaborative FCT project.*
   Joint experimental work on quantum fluids of light.

1.4 Scientific Recognition

1.4.A Jury participation

MSc thesis

2026 Optimization of Reporting Procedures in Smartex.ai Resorting to Real Time Processing Data Pipelines, Mestrado em Engenharia Física at FCUP, July 2026 (Jury)

2025 From Knitting to Dyehouse: AI-Driven Innovations in Fabric Defect Detection and Operational Efficiency, Mestrado em Engenharia Física at FCUP, July 2025 (Jury)

Reviewer

Since 2025 Regular reviewer for journals including Optics Express, Journal of the Optical Society of America B and Optics Communications, in the areas of optical computing, metrology and quantum physics.

1.4.B Invited Talks

2026 Ferreira, Tiago D. "Light as a Versatile Platform for Analogue Physical Simulations and Quantum Imaging Applications" (Invited). In Quantum-SOPHA (Quantum Simulators for One-Dimensional Systems with Photons and Atoms) Workshop, 2026, Peyresq, France.

1.4.C Competitive Rankings

2025 1st in the FCT CEEC Electrical, Electronic and Information Engineering panel.

2019 2nd nationally in the FCT Physics doctoral-grant panel

1.4.D Positions and other activities of scientific recognition

2025 Session Chair at International Day of Light, Porto, May 2025

1.4.E Prizes and Distinctions

Technology awards

2022 **Prize to the team with the best sensor solution at the Advanced Study Course on Optical Chemical Sensors (ASCOS)**

Award by ASCOS winter school organizers for innovative optical sensor proposal to sense methane leaks in closed environments.

Scientific awards

2022 **For the second-place student poster presentation at the 5th International Conference on AOP 2022**

Award by SPIE at the 5th International Conference on Application of Optics and Photonics, Guimarães.

2. Pedagogical Merit

2.1 Academic Activity

2.1A Teaching activity

In this section I describe my past and present teaching activities.

Teaching activities

2020 - 2021 **Invited Assistant Professor, Departamento de Física e Astronomia da Faculdade de Ciências da Universidade do Porto**

1. Physics Laboratory I - (2020/21) - BSc in Physics Engineering, Physics
2. Physics Laboratory III – (2020/21) - BSc in Physics Engineering, Physics

2024 to Present **External Collaborator, Departamento de Física e Astronomia da Faculdade de Ciências da Universidade do Porto**

1. Research Internships Supervision and Co-supervision(2023/24, 2024/25 and 2025/26) – MSc in Quantum Physics (Quarmen Erasmus Mundus Joint Master)

2.2 Pedagogical Projects

In this section, I present pedagogical initiatives that connect my research activity with student training and support the development of experimental and computational learning approaches.

2024 - Present Development of an experimental training framework for QUARMEN research internships in paraxial fluids of light, combining theoretical preparation, numerical modelling, guided laboratory work and data analysis.

2.3 Pedagogical Materials

In this section, I include original teaching materials developed to support student training, particularly through practical and experimental activities, and to provide reusable tools that facilitate interaction with experimental setups, data acquisition and analysis.

2023 - Present Development of interactive computational notebooks and automated experimental-control, acquisition and analysis routines used to support student teaching of paraxial-fluid dynamics, optical interference, wavefront control and quantum-optical measurements. This was used in the context of the QUARMEN research internships.

3. Merit in other relevant activities

3.1 Consulting and services

This section presents consulting activities provided as a researcher of INESC TEC - CAP to various players of industrial and academic sectors.

2024 Scientific Consulting and product design activities for **EGITRON** (LIBS for cork surface analysis) – In collaboration with Pedro Jorge and Nuno A. Silva

2024 Scientific Consulting and Analysis for **SMARTEX** (hyperspectral analysis for fabric defect inspection) – In collaboration with Pedro Jorge and Nuno A. Silva

3.2 Knowledge Dissemination

3.2.A Conferences and Scientific Events

2025 OFS29, Porto Portugal (May 2025) (Conference Support Staff)

2024 to Present Breakfast with Science at INESC TEC - CAP, an initiative to provide a space for the members to share and discuss their current work. (Co-organizer with Nuno A. Silva)

2023 EMSLIBS 2023, Porto Portugal (September 2023) (Conference Support Staff)

2022 European Optical Society Annual Meeting, EOSAM – 2022, Porto Portugal (September 2022) (Conference Support Staff)

2020 to 2023 Scientific meetings: a series of talks on diverse domains of Optics, promoted by the UP SPIE Student Chapter (Organizer and Co-organizer)

2019 II Future of computing School: 5 days of theory and hands-on classes on GPU-based, quantum, neuromorphic and biochemical computing (2019/07/01) - UPTEC Associação de Transferência de Tecnologia da Asprela, Portugal (Conference Support Staff)

2018 1st UPTec School on the Future of Computing (2018/06/25 - 2018/06/29) - UPTEC Associação de Transferência de Tecnologia da Asprela, Portugal (Conference Support Staff)

2016 20.ª Conferência Nacional de Física (FÍSICA 2016) e o 26.º Encontro Ibérico para o Ensino da Física (September 2016) (Conference Support Staff)

3.2.B Outreach and Activities for the General Public

2026 Escola de Física 2026 - Summer School of Physics for high-school students, Faculdade de Ciências da Universidade do Porto (Collaborator)

2025 Escola de Física 2025 - Summer School of Physics for high-school students, Faculdade de Ciências da Universidade do Porto (Collaborator)

Leadership of Students Associations

2022 - 2023 President of the University of Porto SPIE Student Chapter

Membership of Scientific Associations

2019 - Present Early Career Professional Member of SPIE - The international Society for optics and photonics

3.2.C Digital Scientific Communication

2024 to Present QUANTOS Team Website - Development and management of the QUANTOS research-team website for scientific communication, news, research activities and team information.

1. Publications

Preprints

2026

1. Aladjidi, T., Baker-Rasooli, M., Ferreira, T. D., Bramati, A., Albert, M., Glorieux, Q., & Larré, P. É. (2026). Three-observable measurement of the critical velocity in a paraxial superfluid of light flowing past a mobile impurity. arXiv preprint arXiv:2609.03948.
2. Lopes, T., Teixeira, J. M., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026). Characterization of Event-Based Vision Sensors for High-Speed Optical Instrumentation. arXiv preprint arXiv:2607.04741.
3. Lopes, T., Teixeira, J. M., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026). All-optical Edge Computing for Speckle Sensing Interrogation. arXiv preprint arXiv:2605.25805. To appear in Nature Communications Engineering.
4. Teixeira, J. M., Lopes, T., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026). Towards Neuromorphic Event-Based Sensing for High-Speed Multi-Spectral Classification and Tracking of Microparticles. arXiv preprint arXiv:2605.31038.

Peer-reviewed Journals

2026

1. Lopes, T., Teixeira, J. M., Rocha, V. V., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026). Event-based speckle interrogation for high-bandwidth multi-point optical fiber sensing. Sensors and Actuators A: Physical, 408, 117985.
2. Monteiro, C. S., Lopes, T., Teixeira, J., Ferreira, T. D., Jorge, P. A., & Silva, N. A. (2026). Multimodal speckle and polarization fiber sensing for localized, broadband vibration monitoring. Scientific Reports.
3. Rocha, V., Lopes, T., Teixeira, J., Ferreira, T., Monteiro, C., & Silva, N. (2026). Photonic Extreme Learning Machines using Event-Based detection. arXiv preprint arXiv:2607.03975. Accepted in Optics Letters (10.1364/OL.608461).
4. Teixeira, J. M., Lopes, T., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026). Asynchronous event-based spectroscopy for microsecond-resolved spectral reconstruction. Sensors and Actuators A: Physical, 118184.
5. Baker-Rasooli, M., Aladjidi, T., Ferreira, T. D., Bramati, A., Albert, M., Larré, P. É., & Glorieux, Q. (2026). Swimming against a superfluid flow: Self-propulsion via vortex-antivortex shedding in a quantum fluid of light. Physical Review Letters, 136(22), 223401.
6. Gonçalves, C. R., Ferreira, T. D., Monteiro, C. S., & Silva, N. A. (2026). Quantum imaging of the fast-axis angle using Hong–Ou–Mandel interference. APL Photonics, 11(6).
7. Rocha, V., Silva, D., Moreira, F. C., Monteiro, C. S., Ferreira, T. D., & Silva, N. A. (2026). Probing a theoretical framework for a photonic extreme learning machine. New Journal of Physics, 28(6), 064101.

2025

8. Monteiro, Catarina S., Tiago D. Ferreira, and Nuno A. Silva. "High-precision acoustic event monitoring in single-mode fibers using Fisher information." Optics Letters 50, no. 19 (2025): 6117-6120.

2024

9. Ferreira TD, Guerreiro A, Silva NA. Digital Feedback Loop in Paraxial Fluids of Light: A Gate to New Phenomena in Analog Physical Simulations. Physical Review Letters. 2024 Dec 13;133(24):243802.
10. Ferreira, Tiago D., Jakub Garwoła, and Nuno A. Silva. "Exploring the dynamics of the Kelvin-Helmholtz instability in paraxial fluids of light." Physical Review A 109.4 (2024): 043704.
11. Silva, Nuno A., Vicente Rocha, and Tiago D. Ferreira. "Optical Extreme Learning Machines with Atomic Vapors." Atoms 12.2 (2024): 10.

2023

12. Teixeira, Joana, Felipe C. Moreira, João Oliveira, Vicente Rocha, Pedro AS Jorge, Tiago Ferreira, and Nuno A. Silva. "Autonomous and intelligent optical tweezers for improving the reliability and throughput of single particle analysis." Measurement Science and Technology 35, no. 2 (2023): 025208.
13. Silva, D., Ferreira, T. D., Moreira, F.C., Rosa, C.C., Guerreiro, A. and Silva, Nuno A., 2023. Exploring the hidden dimensions of an optical extreme learning machine. Journal of the European Optical Society, 19(1), p.8.

2022

14. Ferreira, T. D., Rocha, V., Silva, D., Guerreiro, A., & Silva, N. A. (2022). Towards the experimental observation of turbulent regimes and the associated energy cascades with paraxial fluids of light. New Journal of Physics.
15. Ferreira, Tiago David Silva, Nuno A. Silva, and Ariel Guerreiro. "Nematic Liquid Crystals as a Tabletop Platform for Studying Turbulence." *U. Porto Journal of Engineering* 8.3 (2022): 42-47.

2021

16. Ferreira, T. D., Novo, J., Silva, Nuno A., Guerreiro, A., & Bertolami, O. (2021). Pressureless static solutions in a Newton-Yukawa gravity model. Physical Review D, 103(12), 124019.
17. Silva, Nuno A., Tiago Ferreira, and Ariel Guerreiro. "Hardware-neutral tools for the exploration of optical phenomena in near-resonant atomic systems." International Journal of Modern Physics C 32.03 (2021): 2150041.
18. Silva, Nuno Azevedo, Tiago D. Ferreira, and Ariel Guerreiro. "Reservoir computing with solitons." New Journal of Physics 23.2 (2021): 023013.
19. Silva, Nuno Azevedo, Tiago D. Ferreira, and Ariel Guerreiro. "Exploring quantum-like turbulence with a two-component paraxial fluid of light." Results in Optics 2 (2021): 100025.

2020

20. Silva, N. A., Almeida, A. L., Ferreira, T. D., & Guerreiro, A. (2020). Dissipative solitons in an atomic medium assisted by an incoherent pumping field. *Journal of Physics B: Atomic, Molecular and Optical Physics*, *53*(6), 065401.
21. Ferreira, Tiago D., et al. "Using numerical methods from nonlocal optics to simulate the dynamics of N-body systems in alternative theories of gravity." *Physical Review E* 101.2 (2020): 023301.

2018

22. Ferreira, Tiago D., Nuno A. Silva, and A. Guerreiro. "Superfluidity of light in nematic liquid crystals." *Physical Review A* 98.2 (2018): 023825.

Peer-reviewed Conference Proceedings

2026

1. Tiago D. Ferreira, Carolina Gonçalves, Catarina S. Monteiro and Nuno A. Silva. Polarization-sensitive Hong-Ou-Mandel microscopy for birefringence imaging using narrowband photon pairs. In SPIE Sensors + Imaging, Edinburgh, 2026. To be published.

2. Sofia Duarte, Tomás Lopes, Joana Teixeira, Tiago D. Ferreira, Bruno Matias, Carlos Almeida, Nuno A. Silva and Catarina S. Monteiro. Low-SWaP optical fiber acoustic sensor for underwater vehicles with event-based interrogation. In SPIE Sensors + Imaging, Edinburgh, 2026. To be published.
3. Catarina S. Monteiro, Tomás Lopes, Joana Teixeira, Tiago D. Ferreira and Nuno A. Silva. Multipoint fiber-optic sensing via sensor fusion of speckle and polarization interrogation. In SPIE Sensors + Imaging, Edinburgh, 2026. To be published.
4. Tomás Lopes, Joana Teixeira, Catarina S. Monteiro, Tiago D. Ferreira, Pedro Jorge and Nuno A. Silva. Evolutionary and reinforcement learning strategies for all-optical speckle sensing interrogation. In SPIE Sensors + Imaging, Edinburgh, 2026. To be published.
5. Lopes, T., Teixeira, J. M., Ferreira, T. D., Monteiro, C. S., Jorge, P. A., & Silva, N. A. (2026, May). All-optical fiber speckle sensing of perturbations using genetic algorithms. In Optical Sensing and Detection IX (Vol. 14086, p. 483). SPIE.
6. Teixeiraa, J. M., Lopesa, T., Ferreirab, T. D., Monteirob, C. S., & AS, P. (2026). Multi-point Optical Fiber Speckle Sensing with Event-Based Sensors for High-Bandwidth Applications. In Proc. of SPIE Vol (Vol. 14086, pp. 140860N-1).

2025

7. Lopes, Tomás, Joana Teixeira, Catarina Monteiro, Tiago Ferreira, and Nuno A. Silva. "Affordable High-Frequency Interrogation of Optical Fiber Speckle Sensors with Event-Based Cameras." In The European Conference on Lasers and Electro-Optics, p. ch_p_7. Optica Publishing Group, 2025.
8. Silva, Nuno A., and Tiago D. Ferreira. "Probing Nonlinear Turbulent Dynamics with a Fully-controllable Platform for Paraxial Fluids of Light." In 2025 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC), pp. 1-1. IEEE, 2025.
9. Ferreira, Tiago D., Catarina Monteiro, and Nuno A. Silva. "Enabling Maximum Precision in Polarimetric Fiber Sensors Using Fisher Information." In The European Conference on Lasers and Electro-Optics, p. ch_15_5. Optica Publishing Group, 2025.
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2. Conference communications

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International Conference Communications – Oral Presentations

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1. * Ferreira, Tiago D., Carolina Gonçalves, Catarina Monteiro, and Nuno A. Silva. “Polarization-sensitive Hong-Ou-Mandel microscopy for birefringence imaging using narrowband photon pairs” In SPIE Sensors + Imaging, 2026, Edinburgh, Scotland.
2. * Ferreira, Tiago D. “Light as a Versatile Platform for Analogue Physical Simulations and Quantum Imaging Applications” **(Invited)**. In Quantum-SOPHA (Quantum Simulators for One-Dimensional Systems with Photons and Atoms) Workshop, 2026, Peyresq, France.
3. Lopes, Tomás; Joana Teixeira; Tiago D. Ferreira; Catarina S. Monteiro; Jorge, Pedro; Nuno A. Silva. Corresponding author: Lopes, Tomás. "All-optical fiber speckle sensing of multi-point perturbations using genetic algorithms". Paper presented in Optical Sensing and Detection IX - SPIE Photonics Europe 2026, 2026. Published
4. Joana Teixeira; Lopes, Tomás; Tiago D. Ferreira; Catarina S. Monteiro; Jorge, Pedro; Nuno A. Silva. Corresponding author: Joana Teixeira. "Multi-point Optical Fiber Speckle Sensing with event-based sensors for high-bandwidth applications". Paper presented in SPIE Photonics Europe 2026, Strasbourg, 2026. Published.

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7. Nuno A. Silva, Tiago D. Ferreira, Technology Pathways For Paraxial Fluids of Light, Quantum Fluids of Light and Matter 2024 (November) Erice, Italy

8. * Tiago Ferreira, Ariel Guerreiro, Nuno A. Silva, Unlocking New Dynamics in Paraxial Fluids of Light with an Optical Feedback Loop, Paper presented in VI International Conference on Applications of Optics and Photonics, 2024.
9. Nuno A. Silva, Vicente Rocha, Tiago D. Ferreira, Quantum Technology Pathways for Paraxial Fluids of Light, Paper presented in VI International Conference on Applications of Optics and Photonics, 2024.
10. Vicente Rocha, Tiago D Ferreira, Nuno A Silva, Towards All-Optical Extreme Learning Machines, Paper presented in VI International Conference on Applications of Optics and Photonics, 2024.
11. Tomás Lopes, Tiago D. Ferreira, Rafael Cavaco, Vicente Rocha, Joana Teixeira, Accelerating Spectral Imaging with Optical Computing: A Fourier-Based Feature Extraction Approach, Paper presented in VI International Conference on Applications of Optics and Photonics, 2024.

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13. * Tiago D. Ferreira, Nuno A. Silva, Duarte Silva, Carla C. Rosa, and Ariel Guerreiro, Experimental turbulent states with paraxial fluids of light in photorefractive media, AOP 2022, Guimarães, Portugal, July 2022
14. Duarte Silva, Nuno A. Silva, Tiago D. Ferreira, Carla C. Rosa, Ariel Guerreiro, Unravelling an optical extreme learning machine, EOSAM 2022, Porto, Portugal, September 2022
15. Duarte Silva, Nuno A. Silva, Tiago D. Ferreira, Carla C. Rosa, Ariel Guerreiro, Shedding light on the inner workings of an optical extreme learning machine, IMOS 2022, Aveiro, Portugal, June 2022

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22. Nuno A. Silva, A. Almeida, André A. Pereira, I. Madureira, T. Ferreira ,A. Guerreiro "Tunable optical analogues using quantum optical systems"; Nanoscale Quantum Optics Conference and MC Meeting, Prague, February 2018

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23. Ariel Guerreiro; A. Pereira; I. S. Madureira; A. L. Almeida; Tiago D. Ferreira; Nuno A. Silva. Corresponding author: A. Pereira. "Artificial intelligence assisted nonlinear Fourier transform". Paper presented in IV International Conference on Applications of Optics and Photonics, 2019., 2019.
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National Conference Communications – Oral Presentations

2023

1. * Tiago D. Ferreira. Fluids of Light in photorefractive media as a playground to explore turbulent phenomena., — MAP-Fis Conference (Virtual, Portugal, July)
2. Coutinho, Felipe C. M. R.; Silva, Duarte; Ferreira, Tiago; Silva, Nuno A., Solving the Time-Independent Schrödinger equation with Deep Diffractive Neural Networks, IJUP 2023, Portugal, May 2023

2022

3. Duarte J. Silva; Nuno A. Silva; Tiago D. Ferreira; Carla C. Rosa; Ariel Guerreiro, Harnessing speckle patterns for an optical extreme learning machine, IJUP 2022, Portugal, May 2022
4. Duarte Silva, Nuno Silva, Tiago Ferreira, Carla Rosa, Ariel Guerreiro, Taming light for novel computing machines, Física 2022, Porto, Setembro 2022
5. * Tiago Ferreira, Nuno A. Silva, Duarte Silva, Vicente Rocha, Carla Rosa, Ariel Guerreiro, Using fluids of light in photorefractive media to create turbulent states, Física 2022, Porto, Setembro 2022

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6. * Tiago D.Ferreira. Optical Analogues in Nematic Liquid Crystals — MAP-Fis Conference (Virtual, Portugal)
7. * Tiago D.Ferreira, Nuno A. Silva and Ariel Guerreiro, Nematic liquid crystal as a tabletop platform for studying turbulence, DCE Congress, Portugal, June 2021
8. * Tiago D. Ferreira. Optical Analogues in Nematic liquid crystals — The Physics League Across Numerous Countries for Kick-ass Students (PLANCKS) (Virtual, Portugal)
9. * Tiago D. Ferreira. Optical Analogues in Nematic Liquid Crystals — Networked intelligent systems workshop, INESC TEC (Virtual, Portugal)

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10. * Tiago D. Ferreira, Nuno. A. Silva, A. Guerreiro; "Optical analogues of superfluids in Nematic Liquid Crystals"; 3rd Doctoral Congress in Engineering – Symposium on Engineering Physics, Porto, (2019).

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11. * Tiago D. Ferreira, A. Almeida, Andre M. Pereira, I. Madureira, Nuno A. Silva, A. Guerreiro, "Using GPGPU supercomputing for Solving the Schrodinger-Newton equation"; Encontro Nacional de estudantes de Física 2018, Porto, (2018).
12. A. L. Almeida, Tiago D. Ferreira, Ines S. Madureira, André Pereira, Nuno A. Silva, Ariel Guerreiro, "Solving Dissipative Nonlinear Schrodinger Equation with GPGPU supercomputing"; Encontro Nacional de estudantes de Física 2018, Porto, (2018).
13. Andre M. Pereira, I. Madureira, T. Ferreira, A. Almeida, Nuno A. Silva, A. Guerreiro, "Nonlinear Fourier Transforms for the Analysis of Nonlinear Systems"; Encontro Nacional de estudantes de Física 2018, Porto, (2018).
14. Ines S. Madureira, A. Pereira, Tiago Ferreira, André Almeida, Nuno A. Silva, A. Guerreiro, "Towards using artificial intelligence in quantum physics"; Encontro Nacional de estudantes de Física 2018, Porto, (2018).
15. * Tiago D. Ferreira. The Schrödinger-Newton Equation: An Application for Studying Self Defocusing Nematic Liquid Crystals Photon-Fluids — UP-SPIE Chapter 2018 (Porto, Portugal)

National Conference Communications – Poster Communications

2023

1. Silva, Juan M; Ferreira, Tiago; Dias, Catarina; Silva, Nuno. Towards All-Optical Computing with Extreme Learning Machines. DCE Congress 23, July 2023
2. Teixeira, Joana M; C. Moreira, Felipe; A. S. Jorge, Pedro; D Ferreira, Tiago; A. Silva, Nuno. Intelligent and Multimodal Optical Tweezers for high-throughput applications DCE Congress 23, July 2023

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3. * Tiago D. Ferreira, Nuno. A. Silva, A. Guerreiro; Nematic Liquid Crystals as a Tunable Medium for the Development of Optical Analogues, 4ª Jornadas em Engenharia Física, Física, Física Médica e Astronomia 2019, Porto, (2019)
4. * Tiago D. Ferreira, Nuno. A. Silva, O. Bertolami, C. Gomes, A. Guerreiro; "Exploring cosmological systems under alternative theories of gravity using the Schrödinger-Poisson formalism"; 3rd Doctoral Congress in Engineering – Symposium on Engineering Physics, Porto, (2019).
5. * Tiago D. Ferreira, Nuno. A. Silva, A. Guerreiro; "A multidimensional solver of the generalized Schrödinger equation based on GPGPU supercomputing"; 3rd Doctoral Congress in Engineering – Symposium on Engineering Physics, Porto, (2019).
6. * Tiago D. Ferreira, Nuno. A. Silva, O. Bertolami, C. Gomes, A. Guerreiro; Using the Schrödinger-Poisson Model to Study Alternative Theories of Gravity, 4ª Jornadas em Engenharia Física, Física, Física Médica e Astronomia 2019, Porto, (2019)

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7. Nuno A. Silva, T.D. Ferreira, André L. Almeida, André Pereira, Inês S. Madureira, Ariel Guerreiro, "Tunable light fluids using quantum atomic optical systems", FISICA 2018, Sociedade Portuguesa da Física, Covilhã, Portugal, (2018)
8. Inês S. Madureira, Tiago D. Ferreira, André L. Almeida, André A. M. Pereira, Nuno A. Silva, A. Guerreiro, "Artificial Intelligence Applied to Quantum Mechanics" FISICA 2018, Sociedade Portuguesa da Física, Covilhã, Portugal, (2018).
9. Inês S. Madureira, Tiago D. Ferreira, André L. Almeida, André A. M. Pereira, Nuno A. Silva, A. Guerreiro"Improving solvers for non-linear problems with high-dimensionality"; FISICA 2018, Sociedade Portuguesa da Física, Covilhã, Portugal, (2018).
10. Inês S. Madureira, Tiago D. Ferreira, André L. Almeida, André A. M. Pereira, Nuno A. Silva, A. Guerreiro, "Solving Non-Linear Quantum Problems through a Convolutional Neural Network"; 3ª Jornadas em Engenharia Física, Física, Física Médica e Astronomia 2018, Porto, (2018).
11. Andre A. Pereira, I. Madureira, T. Ferreira, A. Almeida, Nuno A. Silva, A. Guerreiro, "Nonlinear Fourier Transform for Rogue Ocean Waves"; 3ª Jornadas em Engenharia Física, Física, Física Medica e Astronomia 2018, Porto, (2018).
12. Andre A. Pereira, I. Madureira, T. Ferreira, A. Almeida, Nuno A. Silva, A. Guerreiro, "Nonlinear Fourier Transform"; FISICA 2018, Sociedade Portuguesa da Física, Covilha, Portugal, (2018).
13. Andre A. Pereira, I. Madureira, T. Ferreira, A. Almeida, Nuno A. Silva, A. Guerreiro, "Ocean waves and solitons"; FISICA 2018, Sociedade Portuguesa da Física, Covilhã, Portugal, (2018).
14. Inês S. Madureira, A. Pereira, Tiago Ferreira, Andre Almeida, Nuno A. Silva, A. Guerreiro "Transparent boundary conditions: solving scattering problems in your computer"; Encontro Nacional de estudantes de Física 2018, Porto, (2018).
15. * Tiago D. Ferreira, A. Almeida, Andre M. Pereira, I. Madureira, Nuno A. Silva, A. Guerreiro, "A Multidimensional Solver of the Schrodinger-Newton Equation based on GPGPU Supercomputing", FISICA 2018, Sociedade Portuguesa da Física, Covilha, Portugal, (2018).

16. * Tiago D. Ferreira, A. Almeida, Andre M. Pereira, I. Madureira, Nuno A. Silva, A. Guerreiro, “Metallic Nanorings as Light Orbiting Resonator Devices”, FISICA 2018, Sociedade Portuguesa da Física, Covilha, Portugal, (2018).
17. * Tiago D. Ferreira, A. Almeida, Andre M. Pereira, I. Madureira, Nuno A. Silva, A. Guerreiro, “Small Excitations Dispersion Relation of Self-Defocusing Nematic Liquid Crystals Photon-Fluid”, 3ª Jornadas em Engenharia Física, Física, Física Médica e Astronomia 2018, Porto, (2018).
18. * Tiago D. Ferreira, A. Almeida, Andre M. Pereira, I. Madureira, Nuno A. Silva, A. Guerreiro, “The LORD of Rings: Light Orbiting Resonating Devices”, Encontro Nacional de estudantes de Física 2018, Porto, (2018).
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