Alexia Salavrakos - Curriculum Vitae

Education

Oct. 2014 - April 2019

PhD in Quantum Information Theory
"Bell inequalities for device-independent protocols"
Institute of Photonic Sciences (ICFO), Barcelona, Spain

Sept. 2012 - June 2014

Master in Physics (Research Focus)
Magna Cum Laude - 120 ECTS
Université Libre de Bruxelles, Brussels, Belgium

Sept. 2009 - June 2012

Bachelor in Physics
Magna Cum Laude - 180 ECTS
Université Libre de Bruxelles, Brussels, Belgium

Work experience

June 2022 - present

Quantum Information Scientist
Quandela, Barcelona, Spain

Quandela is a start-up dedicated to building a photonic quantum computer. As a research scientist in the theory team, I develop algorithms for photonic quantum devices, with a focus on quantum machine learning and how classical machine learning can help with the development of a quantum computer.

May 2019 - April 2022

Data Scientist
Clearpay, Barcelona, Spain (previously Pagantis)

Clearpay is a "buy now, pay later" platform for e-commerce. As a data scientist I developed machine learning models as well as monitored risk and performance. I led two main projects, one on fraud detection and one on payment optimisation, from conception to production.

Oct. 2014 - March 2019

Doctoral researcher in Quantum Information Theory
Institute of Photonic Sciences (ICFO), Barcelona, Spain

During my PhD, I studied Bell inequalities for device-independent protocols. Initially developed in the context of quantum foundations, Bell inequalities can also be seen as mathematical certificates that guarantee properties such as randomness or the security of a secret key in cryptography.
My research included both theory and numerics, in particular convex optimisation and semidefinite programming.

August - Oct. 2013

Intern in Radiation Protection Dosimetry and Calibration Group
Belgian Nuclear Research Centre (SCK-CEN), Mol, Belgium

Research in SCK-CEN is focused on peaceful applications of radioactivity and associated societal concerns. During my internship, I conducted a series of experiments to test the properties of smartphones as radiation detectors, which led to a publication.

Technical skills

Programming languages
Python (advanced), R (advanced), Matlab (intermediate)

Data analysis, visualisation, machine learning and databases
SQL; Tableau; R packages data.table, h2o, caret, and ggplot2; Python packages pandas, scikit-learn, keras, tensorflow, seaborn, and matplotlib; MySQL; MongoDB; Amazon Redshift; data build tool

Others
Version control with git and GitHub

Relevant experience

Project management
Knowledge of Agile methodology and associated software like Jira and Confluence

Conference organisation
Organising committee of the YQIS conference in Barcelona, 150 participants (19 - 21 Oct. 2016)
Steering committee of YQIS conference (Dec. 2023 - present)

Student supervision
Supervision of two high school students, ICFO Joves i Ciència program (July 2015)
Supervision of an undergraduate student, ICFO Summer Fellows program (July - Sept. 2017)
Supervision of master students at Quandela for master thesis projects
(March - August 2023, April - Sept. 2024, and May - Sept. 2025)
Co-supervision of a PhD student from Pascale Senellart's group at C2N (Sept. 2023 - present)

Others
Volunteer at Codewomen - Migracode Barcelona (July 2024 - present)

Languages

French - native
Catalan - intermediate
English - fluent
Greek - intermediate
Spanish - fluent
Dutch - intermediate

Personal interests

Yoga, Literature, Hiking, Scuba diving

List of publications and preprints

A. Salavrakos, N. Maring, P.-E. Emeriau, and S. Mansfield. Photon-native quantum algorithms, Mater. Quantum. Technol. **5** 023001 (2025)

A. Salavrakos, T. Sedrakyan, J. Mills, S. Mansfield, and R. Mezher. Error-mitigated photonic quantum circuit Born machine, *Phys. Rev. A* **111**, L030401 (2025)

T. Sedrakyan and A. Salavrakos. Photonic quantum generative adversarial networks for classical data, *Optica Quantum* **2**(6), 458-467 (2024)

G.de Gliniasty, P. Hilaire, P.-E. Emeriau, S. C. Wein, A. Salavrakos, and S. Mansfield. A Spin-Optical Quantum Computing Architecture, *Quantum* **8**, 1423 (2024)

N. Maring, A. Fyrillas, M. Pont, E. Ivanov, P. Stepanov, N. Margaria, W. Hease, A. Pishchagin, T. H. Au, S. Boissier, E. Bertasi, A. Baert, M. Valdivia, M. Billard, O. Acar, A. Brieussel, R. Mezher, S. C. Wein, A. Salavrakos, P. Sinnott, D. A. Fioretto, P.-E. Emeriau, N. Belabas, S. Mansfield, P. Senellart, J. Senellart, and N. Somaschi. A versatile single-photon-based quantum computing platform, *Nat. Photon.* **18**, 603-609 (2024)

E. Woodhead, J. Kaniewski, B. Bourdoncle, A. Salavrakos, J. Bowles, A. Acín, and R. Augusiak. Maximal randomness from partially entangled states, *Phys. Rev. Research **2**,* 042028 (2020)

J. Bowles, F. Baccari, A. Salavrakos. Bounding sets of sequential quantum correlations and device-independent randomness certification, *Quantum* **4**, 344 (2020)

R. Augusiak, A. Salavrakos, J. Tura, and A. Acín. Bell inequalities tailored to the Greenberger-Horne-Zeilinger states of arbitrary local dimension, *New Journal of Physics* **21**, 113001 (2019)

J.Kaniewski, I. Šupić, J. Tura, F. Baccari, A. Salavrakos, and R. Augusiak. Maximal nonlocality from maximal entanglement and mutually unbiased bases, and self-testing of two-qutrit quantum systems, *Quantum* **3**, 198 (2019)

J. Wang, S. Paesani, Y. Ding, R. Santagati, P. Skrzypczyk, A. Salavrakos, J. Tura, R. Augusiak, L. Mančinska, D. Bacco, D. Bonneau, J. W. Silverstone, Q. Gong, A. Acín, K. Rottwitt, L. K. Oxenløwe, J. L. O'Brien, A. Laing, and M. G. Thompson. Multidimensional Quantum Entanglement with Large-scale Integrated Optics, *Science* **360**, 285-291 (2018)

A. Salavrakos, R. Augusiak, J. Tura, P. Wittek, A. Acín, and S. Pironio. Bell inequalities tailored to maximally entangled states, *Physical Review Letters* **119***,* 040402 (2017)

I. Šupić, R. Augusiak, A. Salavrakos, and A. Acín. Self-testing protocols based on the chained Bell inequalities, *New Journal of Physics* **18**, 035013 (2016)

O. Van Hoey, A. Salavrakos, A. Marques, A. Nagao, R. Willems, F. Vanhavere, V. Cauwels, and L. F. Nascimento. Radiation dosimetry properties of smartphone CMOS sensors, *Radiation Protection Dosimetry* **168**, 314-321 (2016)

Conferences - talks and lectures

20/05 - 23/05/2025	Quantum Matter conference in Grenoble, France **Contributed talk** on “An error-mitigated photonic quantum circuit Born machine”
09/12 - 13/12/2024	Winter School on Quantum Machine Learning in Trento, Italy **Lecture** on “Quantum machine learning on photonic platforms”
07/05 - 10/05/2024	Quantum Matter conference in San Sebastián, Spain **Contributed talk** on “SPOQC: a Spin-Optical Quantum Computing Architecture”
14/04 - 27/04/2024	Spring School on Near-Term Quantum Computing in Benasque, Spain **Lectures** on “Photonic Circuits I & II” and “Photonic circuits with Perceval”
18/03 - 21/03/2024	ICFO Spring School on Open-Source Tools for Quantum Science and Technology in Castelldefels, Spain **Lecture** on “Discovering discrete variable photonic quantum computing with Perceval” and **invited talk** on “A versatile single-photon-based quantum computing platform”
19/11 - 24/11/2023	Quantum Techniques in Machine Learning (QTML) conference in Geneva, Switzerland **Contributed talk** on “Variational quantum algorithms implemented on a general-purpose single-photon-based quantum computing platform”
15/12/2022	Alsace Tech conference cycle on AI in Strasbourg, France **Lecture** on “Apprentissage automatique et calcul quantique”
03/10 - 06/10/2017	Young Quantum Information Scientists (YQIS) conference in Erlangen, Germany **Contributed talk** on “Certifying global randomness from partially entangled two-qubit states”
01/03 - 03/03/2017	4th UAB-ICFO-UB Winter School on Quantum Information in Setcases, Spain **Contributed talk** on “Self-testing protocols based on the chained Bell inequalities”
16/11 - 18/11/2016	Colloquium on Quantum Information, Foundations and Applications (IQFA) in Paris, France **Contributed talk** on “Bell inequalities for maximally entangled states”
02/03 - 04/03/2015	3rd UAB-ICFO-UB Winter School on Quantum Information in Setcases, Spain **Contributed talk** on “Novel Tsirelson-like bounds”
05/02/2015	3rd Jornada d’Investigadors Predoctorals Interdisciplinaria in Barcelona, Spain **Contributed talk** on “Can we predict everything?”