

Zoe Garcia del Toro

Date of birth: 19/10/2000 | **Place of birth:** Bogotá, Colombia | **Nationality:** Spanish | **Gender:** Female | **Email address:** zoe.garcia@lip6.fr | **LinkedIn:** zoegarciadeltoro | **Address:** France (Home)

EDUCATION & TRAINING

01/2025 - Current - FRANCE

PH.D. - SORBONNE UNIVERSITÉ

Field(s) of study: Natural sciences, mathematics and statistics | **Thesis:** Higher-order quantum computing and indefinite causal order (supervised by Dr. Jessica Bavaresco and Dr. Damian Markham)

2022 - 2024 - MUNICH, GERMANY

M.SC. QUANTUM SCIENCE AND TECHNOLOGY- TUM AND LMU

With the following couses:
-Quantum Information Theory (Prof. Dr. Christian Schilling)
-Quantum Hardware (Prof. Dr. Stefan Filipp)
-Quantum Optics (Prof. Dr. Immanuel Bloch)
-Tensor Networks (Prof. Dr. Jan von Delft)
-Quantum Tradeoff Relations (Prof. Dr. Michael M.Wolf)
-Advanced Quantum Information (Prof Dr. Barbara Kraus)
Thesis: Quantum Change Point Detenction (supervised by Prof. Dr. Michael M. Wolf)

2018 - 2022 - MADRID, SPAIN

B.SC. PHYSICS- UNIVERSIDAD COMPLUTENSE DE MADRID

Field(s) of study: Physics | **Thesis:** Aharonov–Bohm effect in phase space (supervised by Prof. Dr. Jose AR Cembranos)

WORK EXPERIENCE

01/2026 - 05/2026 - PARIS, FRANCE

UNIVERSITY TEACHING ASSISTANTSORBONNE UNIVERSITÉ

Supported the course taught by Marco Tulio Quintino, leading exercise sessions (22h) and assisting in lectures (2h). Guided students through core concepts in quantum information theory.

28/02/2023 - 31/10/2024 - MUNICH, GERMANY

UNIVERSITY RESEARCH ASSISTANTLEHRSTUHL FÜR THEORETISCHE INFORMATIONSTECHNIK (TUM)

Worked under Prof. Dr. Holger Boche and Yannik Böck on the computability of quantum systems, focusing on the emulation and compilation of quantum gates. Analyzed theoretical limits of unitary implementation and contributed to formal proofs on gate synthesis and complexity.

2017 - 2020 - MECO, SPAIN

ROBOTICS & PROGRAMMING INSTRUCTORASOCIACIÓN DE ROBÓTICA EDUCATIVA KIDDYBOT

Taught robotics and introductory programming to students aged 8–14 in extracurricular and summer programs. Designed and delivered hands-on activities covering basic coding, logic, and robot control, fostering problem-solving skills and interest in STEM.

PUBLICATIONS

Probabilistic and approximate universal quantum purification machines 2026
Zoe G. del Toro, Jessica Bavaresco Zoe G. del Toro, Jessica Bavaresco, Probabilistic and approximate universal quantum purification machines , e-Print: 2604.06325 [quant-ph]. arXiv preprint arXiv:2604.06325

Feynman meets turing: Computability aspects of quantum compiling revisited 2025
Yannik N Böck, Holger Boche, Zoe G. del Toro, Frank HP Fitzek IEEE Y. N. Böck, H. Boche, Z. G. del Toro and F. H. P. Fitzek, "Feynman Meets Turing: Computability Aspects of Quantum Compiling Revisited," in IEEE Transactions on Computers, vol. 75, no. 2, pp. 516-526, Feb. 2026, doi: 10.1109/TC.2025.3626469. IEEE Transactions on Computers Volume 75, Issue 2, Pages 516-526.

Feynman meets Turing: The uncomputability of quantum gate-circuit emulation and concatenation 2024
H. Boche,Y. Böck, Z.G. del Toro and F. H. P. Fitzek IEEE H. Boche, Y. N. Böck, Z. G. del Toro and F. H. P. Fitzek, "Feynman Meets Turing: The Uncomputability of Quantum Gate-Circuit Emulation and Concatenation," in IEEE Transactions on Computers, vol. 74, pp. 1053-1065,2025, doi: 10.1109/TC.2024.3506861. IEEE Transactions on Computers Volume 74, Issue 3, pp. 1053-1065.

Feynman Meets Turing: The Infeasibility of Digital Compilers for Gate-Based Quantum Computing 2024
Yannik N Böck, Holger Boche, Zoe G. del Toro, Frank HP Fitzek IEEE Y. N. Böck, H. Boche, Z. G. del Toro and F. H. P. Fitzek, "Feynman Meets Turing: The Infeasibility of Digital Compilers for Gate-Based Quantum Computing," ICC 2024 - pp. 2440-2445, doi: 10.1109/ICC51166.2024.10622486. IEEE International Conference on Communications (ICC) ICC 2024.

Aharonov–Bohm effect in phase space 2024
Jose A.R. Cembranos, David García-López and Zoe G. del Toro Springer Nature Cembranos, J.A.R., García-López, D. & del Toro, Z.G. Aharonov–Bohm effect in phase space. Eur. Phys. J. D 78, 16 (2024). https://doi.org/10.1140/epjd/s10053-024-00804-y. European Physical Journal D Volume 78, article number 16.

CONFERENCES & SEMINARS

24/01/2026 - 30/01/2026 Riga
29th Annual Quantum Information Processing Conference 2026 Contributed with the poster:
- Zoe G. del Toro, Jessica Bavaresco "Universal Purification Transformation"

INVITED SEMINARS

27/04/2026
"Probabilistic and approximate universal quantum purification machines" QURIOSITY, Telecom Paris

LANGUAGE SKILLS

Mother tongue(s): **SPANISH**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2
FRENCH	C1	C1	B2	B2	B2
GERMAN	A2	B1	A2	A2	A2

HOBBIES AND INTERESTS

Music studies Alongside my academic work, I studied music theory and composition at the *Escuela Municipal de Música y Danza de Meco*, with a focus on percussion, flute, and electric bass.