

Exponent®
Engineering & Scientific Consulting

Paloma Ocola, Ph.D.

Managing Scientist | Computer, Data & Security Sciences
New York
+1-212-895-8157 | pocola@exponent.com

Professional Profile

Paloma Ocola, Ph.D., is a managing scientist in Exponent's Computer, Data & Security Sciences practice with experience in quantum hardware, optics, laser systems, and control systems. She advises law firms, insurers, manufacturers, utilities, and technology companies on patent litigation support, technical due diligence, and control system review, with a particular specialty in optical and semiconductor devices.

Quantum Computing & Hardware

Dr. Ocola brings hands-on expertise in quantum computing hardware developed through doctoral research at Harvard University, where she fabricated and interfaced nanophotonic devices as a communication link for quantum networking for individually controlled neutral atom qubits and investigated their effect on Rydberg qubit coherence for use in neutral atom quantum computing platforms. Her work spanned the full hardware stack — from nanophotonic cavity fabrication and laser feedback control to microwave electronics, magnetic field control, and automated measurements. She advises on the technical realities of quantum hardware architectures, qubit control, and the engineering challenges that separate laboratory demonstrations from scalable quantum systems.

Display Technology Intellectual Property

Dr. Ocola provides technical litigation support in intellectual property disputes involving display technologies, including liquid crystal display (LCD) devices and organic light-emitting diode (OLED) displays. She assists legal teams in evaluating patent claims, assessing technical validity, analyzing prior art, and translating complex optical and semiconductor physics into clear expert analysis. Her background in nanophotonic device physics and optical characterization provides a rigorous foundation for addressing the technical issues that arise in display patent matters. For example, her project work has involved the analysis of ITO electrodes, thin-film transistor (TFT) architectures, and driver control circuitry.

Control System Review

Dr. Ocola conducts control system reviews for clients in automotive, manufacturing, and other industries where automated control and system integration are critical to safety and performance. Her expertise encompasses control theory, feedback system design, software control implementation (including Python, MATLAB, Simulink, and LabVIEW), and systems integration. She evaluates control architectures for design adequacy, failure modes, and regulatory compliance, supporting both engineering consulting engagements and litigation matters involving control system performance or failure.

© 2026 Exponent, Inc. All Rights Reserved

Technical Due Diligence

Dr. Ocola supports investors, acquirers, and legal teams conducting technical due diligence on advanced technology companies and products. Her assessments draw on expertise in optics, semiconductor devices, and control engineering — domains where the gap between claimed and actual technical capability can be significant. She evaluates hardware maturity, system integration risks, intellectual property strength, and the credibility of technical roadmaps, providing clients with rigorous, independent analysis to inform high-stakes decisions. For example, she has worked on technical due diligence efforts to evaluate cutting-edge technologies involving advanced laser systems, AI-enhanced imaging techniques, and radiation-enabled hardware platforms.

Optics & Laser Systems

Dr. Ocola's expertise in optics and laser systems spans optical device characterization, nanophotonic design, and laser feedback control. She has characterized optical sensors and photonic components in challenging experimental environments and applies this background to experiment design, product review, failure analysis, and technical assessment.

Academic Credentials & Professional Honors

Ph.D., Physics, Harvard University, 2023

B.A., Physics, University of Chicago, 2016

Prior Experience

Research Assistant, Harvard University, 2016-2023

Teaching Fellow, Harvard University, 2021

Publications

Ocola P.L., Dimitrova I., Grinkemeyer B., Guardado-Sanchez E., Dordevic T., Samutpraphoot P., Vuletić V., Lukin M.D., "Control and Entanglement of Individual Rydberg Atoms near a Nanoscale Device", Physical Review Letters 132, 113601. (2024).

Scott G.D., Pooley M.A., Ocola P.L. (2024). Quantum Computation: From Hardware Challenges to Software Engineering Tools and Technologies. In: Computer Engineering Applications in Electronic, Biomedical, and Automotive Systems, Nova Science Publishers; DOI: 10.52305/XATK7438

Dordevic T., Samutpraphoot P., Ocola P.L., Bernien H., Grinkemeyer B., Dimitrova I., Vuletić V., Lukin M.D., "Entanglement transport and a nanophotonic interface for atoms in optical tweezers", Science 373, 1511-1514 (2021).

Samutpraphoot P., Dordevic T., Ocola P.L., Bernien H., Senko C., Vuletić V., Lukin M.D., "Strong coupling of two individually controlled atoms via a nanophotonic cavity", Physical Review Letters 124, 063602, (2020).

Presentations

Ocola P.L., Dordevic T., Samutpraphoot P., Bernien H., Grinkemeyer B., Dimitrova I., Vuletić V., Lukin M.D. Nanophotonic quantum interface and transportable entanglement for atom arrays. Oral presentation, 52nd Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics APS Meeting, Virtual, 2021.

Ocola P.L., Dordevic T., Samutpraphoot P., Bernien H., Vuletić V., Lukin M.D. Strong interactions of two individually controlled atoms mediated by a nanophotonic cavity. Poster presentation, Max Planck-Harvard Research Center for Quantum Optics Summer School, Bad Aibling, Germany, 2019.

Ocola P.L., Dordevic T., Samutpraphoot P., Bernien H., Senko C., Schwartz S., Zibrov A., Vuletić V., Lukin M.D. Nanophotonic cavity QED with individually trapped atoms. Poster presentation, 49th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics APS Meeting, Ft. Lauderdale, FL, 2018.

Ocola P.L., Dordevic T., Samutpraphoot P., Bernien H., Schwartz S., Zibrov A., Senko C., Vuletić V., Lukin M.D. Nanophotonic cavity QED with multiple trapped atoms. Poster presentation, Atomic Physics Gordon Research Conference, Newport, RI, 2017.