Paloma Ocola, Ph.D.

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Professional Profile

Dr. Ocola is a physicist with a background in optics and complex control systems. Built upon her training in the field of experimental quantum communication and computation, she brings experience in optical device characterization, optical sensors, control theory, and electromagnetic field modeling. She uses her expertise to help clients tackle diverse challenges including risk management, failure analysis, and technical litigation support at Exponent.

She has completed her Ph.D. at Harvard University, where her research focused on implementing a nanoscale optical device as a communication link for controlled atomic quantum bits. This involved a range of advanced skills spanning hardware development through to implementation of software control, automated measurement and analysis, and systems integration. For example, her work involved designing and fabricating nanophotonic devices, programming timed control sequences, analyzing data, implementing feedback control of laser frequency and power, utilizing microwave electronics, and controlling magnetic fields.

Dr. Ocola is familiar with a range of common software languages and simulation development tools including: Python, MATLAB, LabView, LabRAD, SolidWorks, Lumerical.

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.