Exponent®
Engineering & Scientific Consulting

Paloma Ocola, Ph.D.

Senior Scientist | Electrical Engineering and Computer Science
New York
+1-212-895-8157 | pocola@exponent.com

Professional Profile

Dr. Ocola is a physicist with a background in optics and complex control systems. Built upon her training in the fields of experimental quantum communication and quantum computing, she brings experience in experiment design, 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, electromagnetic field modeling and simulation, and technical litigation support at Exponent.

Dr. Ocola works with clients in offshore wind development, insurance, and law firms. Her work ranges from utility-scale power and energy system modeling, to controls system review, as well as product review for intellectual property and patent disputes involving technologies such as liquid crystal displays and semiconductor devices.

Prior to joining Exponent, Dr. Ocola completed her Ph.D. at Harvard University, where her research bridging quantum optics and atomic physics focused on implementing a nanoscale optical device as a communication link for controlled atomic qubits. This involved a range of advanced skills spanning hardware development through to implementation of software control, automated measurement and data analysis, and systems integration. For example, her work involved designing and fabricating nanophotonic devices, programming timed control sequences, analyzing data, implementing laser feedback control, 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, COMSOL, LabView, LabRAD, SolidWorks, Simulink, 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.