Luis Ernesto Campos Espinoza

Adjunct Professor of Computer Science
Monterrey Institute of Technology and Higher Education
Av. Heroico Colegio Militar 4700, 31300, Chihuahua, Mexico

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Interests

Quantum computing Quantum machine learning Quantum complexity theory

Employment

Adjunct Professor of Computer Science
2025 - Present — Monterrey Institute of Technology and Higher Education, Chihuahua, Mexico

Visiting Professor
2025 - 2026 — Institut Tensorial, École de Technologie Supérieure, Montreal, Canada

Research Scientist
2024 - 2025 — Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia
Development and analysis of distributed quantum algorithms, quantum machine learning algorithms, and supervision of MSc and BSc students

Junior Research Scientist
2023 - 2024 — Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia
Development and analysis of hardware aware quantum algorithms, and supervision of MSc and BSc students

Research Intern
2020 - 2023 — Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia
Numerical simulation and analysis of variational quantum algorithms

Education

Doctor of Philosophy, Computer Science
January 2020 - November 2024 — Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia
Thesis: *On the trainability of variational quantum circuits as algorithmic models*

Master of Science, Computer Science
January 2018 - December 2019 — Monterrey Institute of Technology and Higher Education, Mexico city, Mexico
Thesis: *Quantum tunneling and quantum walks as algorithmic resources to solve hard K-SAT instances*

Bachelor of Science, Engineering Physics
August 2012 - May 2017 — Monterrey Institute of Technology and Higher Education, Monterrey, Mexico

Publications

Published 29 April 2024
E. Campos, D. Rabinovich, A. Uvarov,
Depth scaling of unstructured search via quantum approximate optimization,
Physical Review A 110.1 (2024): 012428

Published 29 April 2024
D. Rabinovich, **E. Campos**, S. Adhikary, E. Pankovets,
D. Vinichenko, J. Biamonte,
On the gate-error robustness of variational quantum algorithms,
Physical Review A 109.4 (2024): 042426

Published 25 October 2022
V. Akshay, H. Philathong, **E. Campos**, D. Rabinovich,
I. Zacharov, X. Zhang, J. Biamonte,
Circuit depth scaling for quantum approximate optimization,
Physical Review A 106, 024238

Published 23 June 2022
D. Rabinovich, S. Adhikary, **E. Campos**, V. Akshay,
E. Anikin, R. Sengupta, O. Lakhmanskaya, K. Lakhmanskiy, J. Biamonte,
Ion native variational ansatz for quantum approximate optimization,
Physical Review A 106, 032418

Published 23 June 2022
D. Rabinovich, R. Sengupta, **E. Campos**, V. Akshay, J. Biamonte,
Progress towards analytically optimal angles in quantum approximate optimisation,
Mathematics 2022, 10(15), 2601

Published 15 September 2021
E. Campos, D. Rabinovich, V. Akshay, J. Biamonte,
Training saturation in layerwise quantum approximate optimisation,
(Letter) Physical Review A 104, L030401

Published 19 August 2021
E. Campos, S. Venegas, M. Lanzagorta,
Quantum walks as algorithmic resources to solve hard k-SAT instances,
Scientific Reports 11, 16845 (2021)

Published 7 July 2021
V. Akshay, D. Rabinovich, **E. Campos**, J. Biamonte,
Parameter concentrations in quantum approximate optimization,
(Letter) Physical Review A 103, 032607

Published 15 March 2021
E. Campos, A. Nasrallah, J. Biamonte,
Abrupt transitions in variational quantum circuit training,
Physical Review A 103, 032607

Preprints

May 2025
G. Paradezhenko, D. Rabinovich, **E. Campos**, K. Lakhmanskiy
Heuristic ansatz design for trainable ion-native digital-analog quantum circuits,
arXiv:2505.15898

Conferences and Posters

Presented 26 November 2024
E. Campos, A. Kardashin, K. Antipin,
Mixture of experts for predicting properties of quantum data,
Quantum Techniques in Machine Learning 2024,
Presentation available at: https://indico.qtml2024.org/event/1/contributions/33/

Presented 26 November 2024
D. Rabinovich, Z. Sayapin, **E. Campos**, S. Adhikary,
Variational State Preparation with Noisy Trapped-Ion Quantum Computer,
Quantum Techniques in Machine Learning 2024,
Presentation available at: https://indico.qtml2024.org/event/1/contributions/37/

Presented 14 July 2023

E. Campos, D. Rabinovich, V. Palyulin, J. Biamonte,
Variational quantum PageRank,
VII International Conference on Quantum Technologies 2023,
Presentation available at: https://www.conference.rqc.ru/session/3

Presented 19 July 2021

J. Biamonte, **E. Campos**,
Variational quantum algorithms and quantum circuits as machine learning models,
4th International Online and Onsite Advanced Course on
Data Science and Machine Learning ACDL 2021,
Presentation available at: https://acdl2021.icas.cc/lecturers/person-5777

Presented 14 July 2021

E. Campos, D. Rabinovich, V. Akshay, J. Biamonte,
Training saturation in layerwise quantum approximate optimisation,
VI International Conference on Quantum Technologies 2021 Digital Edition,
Presentation available at: https://conference.rqc.ru/session/32

Presented August 2016

D. Lopez-Mago, A. Buruete, **E. Campos**,
Quantum optical coherence tomography using three time-energy entangled photons,
SPIE: Opics + Photonics, Optical Engineering + Applications,
Proceeding available at: doi.org/10.1117/12.2237712

Projects

November 2021 - December 2024

Roadmap for Quantum Computing
Industrial partners: Rosatom, Russian Quantum Center
Contract No. 868-1.3-15/15-2021 and R216
Development and numerical simulation of hardware specific
quantum algorithms

June 2020 - December 2022

Leading Research Center for Quantum Technologies
Industrial partner: Russian Quantum Center
Contract No. 014/20
Development and numerical simulation of algorithms for ion-based
quantum computers

Experience

July 2017 - September 2017

Quantum Computing Research Stay
Monterrey Institute of Technology and Higher Education,
Mexico city, Mexico

September 2016 - December 2016

Study Abroad Program
Hong Kong University of Science and Technology,
Kowloon, Hong Kong

July 2016

Quantum Optics Research Stay
Institute of Nuclear Sciences, National Autonomous University of Mexico,
Mexico city, Mexico

July 2015

General Relativity Research Stay
Institute of Nuclear Sciences, National Autonomous University of Mexico,
Mexico city, Mexico

Teaching

August 2025 - September 2025	**Introduction to Quantum Computing, Lecturer** Monterrey Institute of Technology and Higher Education Chihuahua, Mexico
November - December 2022	**Introduction to Linux and Supercomputers, Teaching Assistant** Skolkovo Institute of Science and Technology, Moscow, Russia
October - November 2021	**Introduction to Quantum Computing, Teaching Assistant** King Saud University, Center of Excellence for Information Security, Riyadh, Saudi Arabia

Languages

English	Fluent - TOEFL: 597
Russian	Beginner - A2
Spanish	Native language

Software Skills

Python	Advanced, 5 years of experience
LaTeX	Advanced, 5 years of experience
matlab	Advanced, 4 years of experience
Mathematica	Intermediate, 2 years of experience