Ahmad M. Alkadri

Quantitative Researcher · Applied Mathematician · Chemical Engineer

Pitzer Center for Theoretical Chemistry, UC Berkeley
Challenge Institute for Quantum Computation, UC Berkeley

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Education

University of California, Berkeley — *Berkeley, USA*
Ph.D. Chemical Engineering — *Aug. 2019 - Aug. 2025*

University of California, Berkeley — *Berkeley, USA*
M.A. Mathematics — *Jan. 2023 - Aug. 2025*

University of Calgary — *Calgary, Canada*
B.Sc. Pure Mathematics and Applied Mathematics — *Sep. 2015 - May 2019*

University of Calgary — *Calgary, Canada*
B.Sc. Chemical Engineering — *Sep. 2014 - May 2019*

- Biomedical Engineering Specialization; Internship program

Professional Experience

University of California, Berkeley — *Berkeley, USA*
Postdoctoral Scholar — *Sep. 2025 - Present*

- Designs and implements quantum and classical algorithms for high-dimensional PDEs; experience translating physical models into computational frameworks
- Develops tensor network and Monte Carlo methods for high-dimensional integrals

University of California, Berkeley — *Berkeley, USA*
Graduate Student Researcher — *Aug. 2019 - Aug. 2025*

- Built and optimized finite element solvers for nonlinear PDEs using C++ and Python
- Derived theoretical models from first principles to model biophysical systems
- Analyzed nonlinear dynamical systems using perturbation theory and eigenvalue methods

NOVA Chemicals — *Calgary, Canada*
Chemical Engineering Research Intern — *May. 2017 - Aug. 2018*

- Developed process models using C++, Python, MATLAB, Aspen Plus, and Microsoft Excel to troubleshoot and optimize plant operations
- Developed temperature anomaly detector using time series analysis for low-density polyethylene assets, improving plant safety and efficiency
- Collaborated with professional engineers and research scientists to solve theoretical problems in the areas of phase equilibrium and heat & mass transfer

Pharmaceutical Production Research Facility — *Calgary, Canada*
Research Intern — *May. 2016 - Sep. 2016*

- Collaborated with graduate students and post-doctoral scholars to design experiments investigating the effect of various mechanical and chemical signals on stem cell differentiation
- Assisted in, and undertook a number of experiments to become well-versed in the fundamentals of bioprocessing, literature review, statistical analysis, and the scientific method

Skills

Programming: Python, C++, MATLAB, VBA, Mathematica
Math/Finance: Probability theory, stochastic calculus, optimization, finite element methods, numerical linear algebra
Tools: Microsoft Excel, Git, LaTeX
Languages: English (native), Arabic (fluent), French (basic)

Honours and Awards

2020 **NSERC PGS-D**, Natural Sciences and Engineering Research Council of Canada

2019 **Chemical Engineering Graduate Fellowship**, University of California, Berkeley

2018 **Intern of Merit**, Schulich School of Engineering

2017 **25th Anniversary Scholarships in Mathematics and Statistics**, University of Calgary
Wayne Hugo Memorial Scholarship, University of Calgary

2016 **AIHS Summer Research Studentship**, Alberta Innovates - Health Solutions
Louise McKinney Scholarship, University of Calgary
Fluor Canada Ltd. Scholarship, University of Calgary

2015 **TransAlta Memorial Scholarship**, University of Calgary

2014 **President's Admission Scholarship**, University of Calgary

Publications

** equal contribution*

Published

A. M. Alkadri, K. K. Mandadapu. 2025. Irreversible thermodynamics of curved lipid membranes. II. Permeability and osmosis. *Physical Review E*. DOI: 10.1103/wfj9-7l6r. arXiv:2412.19300

T. D. Kharazi, **A. M. Alkadri**, J. Liu, K. K. Mandadapu, and K. B. Whaley. 2025. Explicit block encodings of boundary value problems for many-body elliptic operators. *Quantum*. DOI: 10.22331/q-2025-06-04-1764

Preprint

A. M. Alkadri, T. D. Kharazi, K. B. Whaley, and K. K. Mandadapu. 2025. A Quantum Algorithm for the Finite Element method. arXiv:2510.18150

Outreach & Professional Development

Service and Outreach

Jan. 2020 - present **Bay Area Scientists Inspiring Students**, Volunteer

Feb. 2022 **WCCUSD STEM Fair**, Volunteer Judge

Sep. 2018 - Apr. 2019 **AIChE UCalgary Student Chapter**, Vice President