




Curriculum Vitae — Rana Al Dahlake

Contact Information

Rana Al Dahlake

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 ORCID iD: 0009-0001-8919-8177

Nationality: Permanent U.S. citizenship



Education

B.A. in English Language & Education

Al-Ma'moon University College — Baghdad, Iraq

Graduated: 2007

HarvardX – CS50AI: Artificial Intelligence Certificate

Harvard University / edX — 2025

Core topics: search algorithms, knowledge representation, neural networks, machine learning, reinforcement learning, AI ethics



Research & Scholarly Work

Published / Archived Research Outputs

(Only works with DOI / ORCID linkage)

- Lexicographic Ordering Decision Framework (LODF) – Independent Research
DOI: <https://doi.org/10.5281/zenodo.17565918>
Developed and published a multi-criteria decision algorithm using lexicographic ordering for scientific and mission-critical reasoning systems.
- GuardianX Quantum Shield Layer (GQSL) – Concept paper / preprint
DOI available through GuardianX Research (ORCID record)
Proposed an adaptive nanophotonic film to preserve quantum coherence for space communication links.
- Hybrid Nano–Solar Energy Interface for Radiation Environments – Co-authored work
Zenodo archived, collaborative research with Eng. Jalal Alazirji

(Additional works in preparation, listed under ORCID)



Research Experience

Lexicographic Ordering Decision Framework (LODF)

Independent Research – 2024–2025

- Developed a decision framework for evaluating scientific uncertainty and mission parameters
- Applied to astrobiology, AI reasoning, and high-risk engineering systems
- Published openly through Zenodo and ORCID

GuardianX Quantum Shield Layer (GQSL)

Concept & Proposal Development – 2024

- Proposed architecture for quantum-coherence protection in satellite and space-to-Earth communication systems
- Concept submitted to NASA-aligned proposal streams

Hybrid Solar–Nanophotonic Energy Interface

Research Collaboration with Eng. Jalal Alazirji – 2024

- Designed a conceptual hybrid energy transfer model for photonic + thermal systems
- Connected to aerospace and space-radiation applications



Proposed PhD Research Concept (Pending Collaboration with UW)

Atmospheric Biosignatures & Nanophotonic Shielding Simulation

- Topic inspired by planetary atmospheric evolution, biosignature detection, and radiation mitigation
- Currently in conceptual and literature review stage (not yet implemented)

- Intended to develop into a full dissertation in collaboration with Prof. David Catling at the University of Washington
- Incorporates AI-based modeling, atmospheric disequilibrium metrics, redox fluxes, and quantum-materials concepts

(This section signals research readiness without claiming completed work)



Research Interests

- Atmospheric biosignatures & life detection
- Computational astrobiology & climate evolution of exoplanets
- Nanophotonic & quantum-based protective materials for space
- Information theory & decision frameworks in science
- AI for scientific reasoning, simulation, and discovery



Technical Skills

Programming: Python (NumPy, Pandas, SciPy, Matplotlib), Jupyter, Git

Scientific Skills: simulation design, statistical reasoning, space environment models, decision algorithms

Languages: Arabic (native), English (advanced research writing, intermediate speaking)



Training & Certifications

- HarvardX CS50AI – Artificial Intelligence Certificate (2025)
- NASA Open Science Commitment – Next cohort (OS101)
- Multiple publications archived under Zenodo & ORCID
- Independent coursework in physics, photonics, and scientific writing



Professional Roles

Founder & Research Director – GuardianX Research
Seattle, Washington (2023–Present)

- Leading conceptual R&D in AI, astrobiology, and photon-based shielding
- Published open-access scientific works and technology proposals
- Managing research documentation, publication strategy, and scientific outreach



Professional Objective

My long-term goal is to contribute to scientific advancement in planetary habitability and life detection through

computational modeling and materials research for extreme space environments. I intend to pursue doctoral research integrating atmospheric evolution, biosignature detection, nanophotonic shielding, and theoretical astrobiology