Noor Aldeen **Almusleh**

Physicist · Data Scientist

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Education

Korea Institute of Energy Technology

Naju-si, South Korea

Ph.D. in Engineering

August 2023 - present

- **Artificial Intelligence in Material Discovery**: Leveraged advanced AI technologies—including reinforcement learning, graph neural networks, and density functional theory (DFT) simulations—to accelerate the discovery of innovative materials. This technological approach facilitated the exploration of material properties and behaviours at an unprecedented scale and speed.
- **Quantum Computing Noise Reduction Technologies**: Utilized machine learning algorithms to enhance the understanding of noise sources in superconducting quantum computers, specifically targeting two-level systems and their origins. Applied computational physics and AI-driven techniques to mitigate these noise factors, thereby improving quantum coherence and computational accuracy.
- **Optimization of Solar Cell Fabrication with Neural Networks**: Employed graph neural networks and physics-informed neural networks to optimize the fabrication processes of perovskite solar cells. This technology-focused approach is aimed at enhancing efficiency and manufacturability, contributing to advancements in renewable energy technologies.

Al Al-bayt University

Mafraq, Jordan

B.Sc in Physics

July 2014 - January 2018

- GPA– 84.5% (Excellent), with first-class honors.
- This is a four-year program with a fast track option delivered in English as the language of instruction. Relevant modules studied include Quantum Physics I (87%), Quantum Physics II (94%), Thermodynamics (90%), Statistical Mechanics (95%), Electricity and Magnetism I (74%), Electricity and Magnetism II (77%), Mathematical Physics I (94%), Mathematical Physics II (89%), Mathematical Physics III (95%), Astrophysics (98%), Nuclear Physics (80%), and Particle Physics (94%).
- My final year dissertation titled "**Heavy Quarkonium Mass Spectra From Complex Potential**"; this study was an attempt to improve our understanding of the heavy mesons (such as the bottomonium) by studying the solution of the relativistic Schrödinger equation for some complex potential.

Self-Learning

Certificates

- I have a strong background in programming, having completed multiple online courses and boot camps to master various programming languages and technologies. I have a solid understanding of **Python** and **Julia**, and have also gained experience in web development using **Flask, HTML, CSS, and Bootstrap**. My skills have been put into practice through the development of my `personal website`, as well as several dashboards and ongoing projects. In addition, I have also worked on various research projects in astrophysics as a team member and have successfully made significant contributions to these projects. I have also gained experience in Agile methodology and have also worked with version control systems like **Git** and **GitHub**. This made me confident in my ability to contribute to any programming-related role.
- I have gained expertise in machine learning and deep learning through the use of libraries and frameworks such as **Keras, TensorFlow, and Sci-Kit Learn**. In addition, I am well-versed in using other Python libraries such as **Numpy, Pandas, and Scipy**, as well as visualization tools such as **Matplotlib, Seaborn, Plotly, and Dash**. I have applied this knowledge to several personal projects, such as a natural language processing (**NLP**) project focused on sentiment analysis using the Bidirectional Encoder Representations from Transformers (**BERT**) language model to make predictions. I used the **explainable AI** methods, such as Local Interpretable Model-Agnostic Explanations (**LIME**), to decide which model is to trust. Additionally, I have worked on computer vision (**CV**) projects, such as food recognition. Through these projects, I have gained valuable experience in applying machine learning and deep learning techniques to real-world problems, and I am eager to continue to expand my skills in this field.
- Completed the two-week intensive course which covered many topics in quantum computing such as **Deutsch-Jozsa Algorithm, Grover's Algorithm, quantum classifiers, Quantum Approximate Optimization Algorithm (QAOA), quantum fidelity, and quantum hardware**, completing all graded lab work assignments with a final cumulative score of 100%, demonstrating applied understanding and comfort with and about Quantum Computing and Quantum Machine Learning using Qiskit.

Research Experience

Astrophysics research group
Amman, Jordan

Researcher
October 2019 - June 2021

- I contributed to a few research projects in astrophysics studying carbon-enhanced metal-poor stars. This role required wearing multiple hats. For example, I used different Python libraries such as NumPy, AstroPy, Sci-Kit Learn, Matplotlib, and Seaborn to complete a **data-driven approach** to study the abundance ratios of sample stars and construct action space maps indicating the eccentricity and spherical coordinates of these stars (from our study and the literature). Also, I wrote this research paper in LaTeX.
- While working as a part of this team, I advanced my skills in **data analysis** and programming, as well as gained experience in conducting research and presenting my findings in a professional setting to respond to the needs of this research field. This was accomplished while maintaining high standards and pace. It was a valuable and rewarding experience that has prepared me for future academic and professional pursuits.

Al Al-bayt University
Mafraq, Jordan

Research Assistance
June 2016 - December 2017

- I conducted a theoretical study of the Cornell-like potential with a complex term in order to improve our understanding of the behavior of mesons constructed from heavy quarks (namely the bottom quark and the charm quark).
- In addition, I served as a teaching assistant for undergraduate research methods courses, where I provided support to students new to research, as well as feedback to help students improve their work before final submission. My responsibilities included instructing students on using LaTeX, literature review, the scientific method, scientific paper organization, and editing and debugging the template used at the university.

Employment Experience

Ministry of Education, UAE
Dubai, UAE

Teacher
January 2019 - present

- As a high school physics teacher, I taught Advanced Placement (AP) Physics courses for grades 9-12, with the goal of preparing students for the AP Physics 2 and AP Physics C exams. I taught in a variety of settings, adapting to different situations, including traditional classrooms, online courses, and hybrid classrooms. In addition to delivering lesson plans and exams, I also created individualized support plans to respond to the needs of diverse learners. In addition to my teaching duties, I also organized and supervised various science activities, such as lab experiments, field trips, and science fair projects. I also provided guidance and support to students who were interested in participating in these events.
- I have had the opportunity to collaborate with colleagues from diverse countries and cultural backgrounds, including the USA, Canada, the UK, New Zealand, Egypt, India, the Philippines, Jordan, and the UAE. In this role, I planned cross-subject activities and established the general direction for our lessons to assist students in making connections between different subjects, such as chemistry and physics or physics and mathematics. This required effective communication and organization skills to ensure that all members of the teaching team were aligned with our approach.
- I utilized Python to organize and **analyze class data**, and developed simulations and codes to assist students in graphing and checking their lab assignments. This allowed me to further develop my programming skills and apply them in a teaching setting.

Selected Publications

Metal-poor Stars Observed with the Automated Planet Finder Telescope. III. CEMP-no Stars are the Descendant of Population III Stars
Astronomische Nachrichten (AN)

Doi: http://doi.org/10.1002/asna.202113867
Accepted: June 2021

Authors: **Nour Aldein Almusleh**, Ali Taani, Sergen Özdemir, Maria Rah, Mashhoor A. Al-Wardat, Gang Zhao, Mohammad K. Mardini

The Origin of LAMOST J1109+7459
Segue Virtual Journal

Doi: https://doi.org/10.52526/25792776-2020.67.2-267
Accepted: November 2020

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