

Muhammad Husnain Shahid

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● EDUCATION AND TRAINING

09/2020 – 07/2024 Lahore, Pakistan
BS PHYSICS Pakistan Institute of Engineering and Applied Sciences (PIEAS)

- Main Subjects (Advanced Physics Labs, Particle Physics, Quantum Mechanics, EMT I & II, Solid State Physics, Micro Nanofabrication, Linear Algebra, MMP-I and MMP-II, Classical Mechanics, Optics, Statistical Mechanics, Differential Equations, Waves and Oscillation, Probability and Statistics, Artificial Intelligence, Natural Language Processing)
- Occupational skills and techniques (Problem-Solving, Mathematics, Quantum Computing, Semiconductor Fabrication Process, Machine Learning, Deep Learning, AI algorithms Programming, Data Science, Experimental techniques)

Website Pieas.edu.pk | **Field of study** Physics , Natural sciences, mathematics and statistics not further defined |
Final grade 3.25 | **Thesis** Jet Tagging for LHC data using CNN Transformer

● WORK EXPERIENCE

01/07/2024 – CURRENT Islamabad
ADVANCED AI LLM BOOTCAMP NUST

The Bootcamp is just about to end. I have learned many advanced techniques in AI so far. I have gained knowledge and hands-on experience on:

- Mastering Prompt Engineering, NLP, and Transformers
- Advanced transformer model architecture
- Crafting and training LLM models
- Scaling LLMs: Training techniques and performance boosts
- Unlocking a mixture of experts (MoE)
- Deployment

15/07/2023 – 25/10/2023 Islamabad, Pakistan
QUANTUM INTERN NATIONAL CENTRE FOR PHYSICS

- Traning on Quantum Computing
- Basic training in Quantum Machine Learning
- Quantum algorithms including Grover and Shors
- Studied Post-Quantum Cryptography algorithms like CRYSTAL Dilithium and Kyber

07/07/2022 – 15/09/2022 Lahore, Pakistan
MEDICAL PHYSICS INTERN CENTRE FOR NUCLEAR MEDICINE

- Training in Hotlab procedures
- Quality Control of radiopharmaceuticals
- Radiation Protection
- Imaging on Gamma Cameras and SPECT-CT Systems
- Training on Digital X-ray systems
- Didactic lectures and demonstrations were also given on the aforementioned topics.

10/06/2019 – 15/07/2020 Sheikhpura, Pakistan
INSTRUCTOR ASPIRE ACADEMY

- Taught High School Physics and Chemistry

● DIGITAL SKILLS

IBM-Q Experience and Qiskit (an open-source Quantum Computing framework) | Variational Quantum Eigensolver | Quantum Computing (Qiskit) | Quantum Optics | Microsoft Office | Machine Learning | Deep Learning | Python | Pandas | Numpy | Git | Data Science | Data Collection, Data Processing, Data Analysis, Data Visualisation | Exploratory Data Analysis | SQL | matlab, scilab, mathematica | Semiconductor Devices | Nanofabrication | Text processing (Word, LaTeX) | Proficiency in Canva application | draw.io Diagrams | Generative AI | LLMs

● CONFERENCES AND SEMINARS

19/08/2023 – 30/08/2023 National Centre for Physics, Islamabad

12th LHC Summer School

I attended lectures on neutrino physics, dark matter, standard model, its lagrangian, things beyond the standard model and its current status, silicon detectors at LHC, statistics in HEP, top quark physics, exotic physics, laser physics of detectors, particle collision inside LHC, QED, QCD, and root analysis by CERN research scientists and theoretical physicists like Dr. Albert De Roek and Dr. John Ellis.

I also attended labs on C++ and Python programming for particle physics deep insights.

23/07/2023 IST, Islamabad

Summer School on CubeSat Development

Dr.Rehan and his team gave engaging lectures on CubeSat Satellite development, satellite navigation Systems, and the Physics behind rocket science. He told us the importance of this field. I also worked in labs where I encountered different software including Rocket designing, Orbit designing, and Autocad

23/09/2023

Workshop on Atto second pulses

I attended lectures on the Noble Prize 2023 by Dr. Syed Ali Hussain from Lund University. who worked with the Noble Laurates. He explained the whole physics of the Attosecond. The process, and types of equipment used in the experiments. He also talked about the past, present, and future of attosecond pulses.

22/07/2024 – 26/07/2024 Remote (Perimeter Institute)

Celestial Holography Summer School 2024

This was an advanced summer school on quantum fields and strings. The school focused on particle physics, special relativity, QFT, condensed matter physics, and cosmology. Modern string theory has grown to be a broad and varied field of research with strong connections to quantum gravity, particle physics, and cosmology.

An exciting new framework known as 'holography' has emerged from string theory whereby quantum gravity is formulated in terms of quantum field theory in one less dimension.

Remote (Virginia Tech and C2QA)

2024 Quantum Information Science (QIS) and Engineering High-School Summer Program

I'm currently attending this summer school.

● PROJECTS

09/2023 – 06/2024

Particle Multi Axis Transformer

This project is associated with **particle physics and AI**. It caters to the crucial problem in High energy physics, "JET Tagging". In this project, I have Fine-tuned the Transformer model on the World's largest dataset JETCLASS on the particles and their interactions. I have achieved novel accuracy and AUC scores in this regard. I successfully **published a paper on this research**.

Link <https://www.bing.com/ck/a?!&p=308f52431bed2296JmItdHM9MTcyMjcyOTYwMCZpZ3VpZD0yZTE1ZjNkZS01Zj11LTy2YmEtMmZiMy1lNzEwNWU3NzY3MmYmaW5zaW51e7105e77672f&psq=particle+multi+axis+transformer&u=a1aHR0cHM6Ly9hcnhpdi5vcmcvaHRtbC8yNDA2LjA2NjM4djE&ntb=1>

Particle Transformer for Jet Tagging

I have reproduced this paper. It is similar to the project I have done in my FYP.

Diffusion Process in Micro Nanofabrication

It was a term project related to the Micro-Nano Fabrication course I studied last semester. I worked computationally on the simulation software where I learned the diffusion of dopant in the semiconductor.

Image classification using VGG-16

It was a term project of the Artificial Intelligence course. The task is to classify human gestures and movements. The dataset is in the form of images.

Easy Grading Sysytem

It was an NLP term Project. I took Essay data from Hugging Face and created an essay grading system that grades essays from 1 to 5.

RESEARCH INTERESTS

Advance AI

I have studied courses on Deep learning, and neural networks and learned how Artificial intelligence can solve hard physics problems that a theoretical physicist fears. I have used transformers (advanced deep learning architectures) in my FYP. I have recently passed my Oracle Infrastructure Generative AI Exam Certification. I'm interested in researching AI in collaboration with physics fields like quantum physics, particle physics, healthcare, chemistry, finance, mathematics, etc.

Quantum Information (Computational/Experimental)

As a modern physics student, I'm very much oriented toward quantum technologies like Quantum Computing, Quantum Cryptography, Quantum Information, etc. I currently seeking organizations where I translate my skills and enthusiasm. I'm exceedingly interested in researching Quantum information and related fields. I have done courses on quantum computing from OpenHPI, and IBM, and worked on quantum algorithms. I also have a good understanding of the mathematics of quantum computing.

Healthcare IT

As a physics student, I like to see things from different angles. One of the emerging fields in physics is Medical Physics. My interest in healthcare arose from my internship which I have done in Medical Physics and Nuclear Medicine from CENUM. I also gained Enough knowledge of AI, LLMs, and related technologies. So I'm open to doing research projects in this domain.

LANGUAGE SKILLS

Mother tongue(s): URDU
Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	B2	B2	C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

VOLUNTEERING

11/2023 – 06/2024 Islamabad
PIEAS Voluntary Society (PVS)

We have conducted various events to aid society:

- Blood Camp
- Cancer Awareness Camp

- Fund collection for poor people
- TEDx for innovators and creators