

INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE

ADVERTISEMENT TO FILL UP PROJECT POSITIONS*

Dated: 11/9/2026

Applications are invited from Indian nationals only for project position(s) as per the details given below for the **research** project(s) under the Principal investigator **Prof. Pradumn K. Pandey**, Deptt./Centre of **Computer Science & Engineering**, Indian Institute of Technology, Roorkee.

1. Title of project : Qu-GEN A versatile Quantvolutional Neural Network Library for Enhanced Image Analysis on Quantum Computers
2. Sponsor of the project : DST
3. Project position(s) and number : JRF (1)
4. Qualifications (Eligibility) : Post Graduate Degree in Basic Science OR Graduate / Post Graduate Degree in Professional Course selected through a process described through any one of the following:
 - a. Scholars who are selected through National Eligibility Tests - CSIR-UGC NET including lectureship (Assistant Professorship) and GATE.
 - b. The selection process through National level examinations conducted by Central Government Departments and their Agencies and Institutions such as DST, DBT, DAE, DOS, DRDO, MOE, ICAR, ICMR, IIT, IISC, IISER, NISER etc.
5. Emoluments : Rs. 37000 + HRA
6. Duration : 2 Years 11 Months
7. Job description : The selected candidate will work on the project “Qu-GEN: A Generalizable Quantvolutional Toolkit,” focused on developing a hybrid quantum–classical framework for advanced image analysis. The work will involve integrating classical machine learning and deep learning, particularly Convolutional Neural Networks (CNNs), with quantum computing techniques to improve the extraction of subtle and higher-order correlations from complex image datasets.

The candidate will be involved in the design, implementation, and optimization of quantvolutional layers using shallow, hardware-efficient Parameterized Quantum Circuits (PQCs). The work will include encoding local image patches into quantum states, developing trainable quantum

feature-engineering kernels, optimizing quantum gate sequences, and generating quantum-enhanced feature maps for integration with classical deep-learning architectures.

Key responsibilities will include:

1. Developing and implementing hybrid quantum–classical machine-learning models for image analysis.
2. Designing trainable Parameterized Quantum Circuits (PQCs) for quantum feature extraction.
3. Developing and optimizing quantum data-encoding/embedding circuits for image patches.
4. Integrating quantum feature maps with CNN and other deep-learning architectures.
5. Training and evaluating quantum and classical model components for different datasets and image-analysis tasks.
6. Investigating the ability of quantum-enhanced features to capture fine textures, weak signals, subtle structural variations, and higher-order correlations.
7. Evaluating the framework for applications such as biomedical imaging and materials microstructure analysis.
8. Comparing the performance and generalizability of the proposed quantum-enhanced framework with conventional CNN-based approaches.
9. Contributing to the development of a generalizable quantum toolkit that can be adapted to different datasets and tasks.
10. Documenting algorithms, experimental results, and technical developments and contributing to research publications and project reports.

Desired Background and Skills:

Candidates should have a strong background in Machine Learning, Deep Learning, Computer Vision/Image Processing, or related areas. Experience with CNNs and programming for machine-learning applications is desirable. Knowledge or experience in Quantum Computing, Quantum Machine Learning, Parameterized Quantum Circuits, or hybrid quantum–classical algorithms would be an advantage.

The position is particularly suitable for candidates interested in interdisciplinary research at the intersection of Arti-

ficial Intelligence, Machine Learning, Image Analysis, and Quantum Computing.

8. The selected candidate may get an opportunity for PhD admission.

9. Terms & Conditions:

1. Candidates before appearing for the interview shall ensure that they are eligible for the position they intend to apply.
2. Candidates desiring to appear for the Interview should submit their applications with the following documents through email by 20/9/2026:
 - CV
 - Degree Certificates
 - Experience Certificates
 - Aadhar Card
3. Candidate shall bring along with them the original degree(s)/certificate(s) and experience certificate(s) at the time of interview for verification.
4. Preference will be given to SC/ST candidates on equal qualifications and experience.
5. Please note that no TA/DA is admissible for attending the interview.

The last date for application to be submitted to office of Principal Investigator is **20/9/2026** by **11:59 PM**.

If selected, the candidate will be joining the position **as soon as possible**.

Please submit your application via email to: **pradumn.pandey@cs.iitr.ac.in**

Tel:



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Signature of Dean SRIC

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*To be uploaded on IIT Roorkee website and copy may be sent to appropriate addresses by PI for wider circulation.