

GOVERNMENT COLLEGE FOR MEN (A), KADAPA
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A Report On

EXPERT TALK ON

**QUANTUM COMPUTING: THE NEXT REVOLUTION IN
COMPUTATION**

ON

13th FEBRUARY 2026

UNDER DBT STAR COLLEGE SCHEME

ORGANIZED BY

DEPARTMENT OF COMPUTER SCIENCE



EXPERT TALK ON
“QUANTAUM COMPUTING: THE NEXT REVOLUTION IN
COMPUTATION”



13th FEBRUARY 2026

Organized by Dept. of Computer Science, Govt. College for Men(A), Kadapa

Under DBT Star College Scheme

by

Dr. DADAMIAH PMD SHAIK, M.Sc. (Gold Medal), Ph.D., ISTE

Associate Professor (Ratified, JNTUH) & HOD

Department of Physics,

Vardhaman College of Eng. Hyderabad, Telangana.

Objectives:

Considering the growing importance of **Quantum Computing** and its transformative potential across multiple sectors, a One-Day Expert talk is planned with the following objectives:

- To disseminate knowledge of Quantum Computing among students, researchers, and academicians.
- To discuss the fundamentals of Quantum Computing, including qubits, superposition, entanglement, and quantum gates.
- To understand the evolution of Quantum Computing from theoretical foundations to practical implementations.
- To explore quantum algorithms such as Shor’s and Grover’s algorithms and their real-world significance.
- To discuss the current status of Quantum Computing research and development in India and across the world.
- To examine applications of Quantum Computing in cryptography, optimization, healthcare, finance, artificial intelligence, and material science.
- To understand the challenges, limitations, and future directions of Quantum Technologies.
- To create awareness about national and international quantum initiatives and research programs.

This Expert talk is intended to provide opportunities for educationalists, researchers, professionals, and students to upgrade their knowledge in the area of Quantum Computing and emerging Quantum Technologies.

ABOUT THE EXPERT TALK

Quantum Computing is an emerging and transformative technology that leverages the principles of quantum mechanics to perform computations far beyond the capabilities of classical computers. Unlike traditional computing systems that use bits 0s and 1s, quantum computing utilizes qubits, which can exist

in superposition and become entangled, enabling parallel computation and exponential processing power for certain complex problems.

This technology has the potential to revolutionize fields such as cryptography, optimization, artificial intelligence, drug discovery, climate modelling, finance, and material science. However, the development of quantum computing systems also presents significant technical and theoretical challenges. Issues such as quantum decoherence, error rates, scalability, hardware stability, quantum noise, and secure quantum communication require careful research and innovative solutions.

For instance, while quantum algorithms like Shor's algorithm threaten classical cryptographic systems, the development of quantum-safe cryptography is essential to ensure data security in the post-quantum era. Similarly, building stable quantum hardware demands advancements in cryogenics, materials science, and quantum error correction. Therefore, researchers and designers must address these scientific, engineering, and security challenges to fully harness the potential of Quantum Computing.

Contents of the Expert Talk (Quantum Computing)

- Introduction to Quantum Computing
- Fundamentals of Quantum Mechanics for Computing
- Qubits and Quantum States
- Superposition and Entanglement
- Quantum Gates and Quantum Circuits
- How Quantum Computing Works
- Quantum Algorithms (Shor's Algorithm, Grover's Algorithm, etc.)
- Quantum Hardware Technologies (Superconducting Qubits, Trapped Ions, Photonic Systems)
- Quantum Programming Frameworks (Qiskit, Cirq, etc.)
- Quantum Error Correction and Noise
- Applications of Quantum Computing
- Industries Adopting Quantum Technologies
- Post-Quantum Cryptography
- Challenges and Future Trends in Quantum Computing

EXPERT TALK AUDIENCE

The Expert talk is open to UG students, Research Scholars and faculty members. A total of 70 students and faculty are participated in this Expert talk.

FINANCIAL ASSISTANCE

The Expert talk was conducted on as part of DBT Star college scheme.

PARTICIPANT'S ATTENDANCE

Attendance was taken for the participants on all the one day. The photo copy of the attendance sheet is enclosed in Annexure.

FOOD AND REFRESHMENTS

For all the One-day high quality and varieties of Snacks and Tea/Coffee was served to the participants. Tea / Coffee were served in the morning between 11:30 am to 11:45 am.

RESOURCE PERSON PROFILE

Dr. DADAMIAH PMD SHAIK is an accomplished academician with over 18 years of teaching and 15+ years of research experience in Physics, currently serving as Associate Professor and Head of the Department of Physics at Vardaman College of Engineering. He earned his Ph.D. from Sri Venkateshwara University and received a Gold Medal in M.Sc. Physics. His research interests include Quantum Computing, Nanomaterials, Energy Storage Devices, and Condensed Matter Physics, with 27+ Scopus/SCI publications, an h-index of 15, and 892 citations. He has guided research scholars, reviewed for reputed journals, and served as Principal Investigator for projects funded by Science and Engineering Research Board (SERB) and Department of Science and Technology (DST). A recipient of multiple Best Researcher Awards, he also holds key academic and administrative positions and is a Life Member of the Indian Society for Technical Education (ISTE).

EXPERT TALK INAUGURATION

The Expert talk commenced with a formal inaugural session on 13th February 2026.

- **President: Dr. M. Ravi Kumar**, Principal of the college, presided over the session and highlighted the importance of technology in current trends.
- **DBT-STAR Coordinator: Dr. Y. Savitri** emphasized the importance of such programs in advancing technology and research.
- **Convener: Y. Anitha**, In-charge, Dept. of Computer Science introduced the objectives of the Expert talk and the challenges and future trends in Quantum Computing technology.
- **Organizing Secretary: T. Manohar Reddy**, Lecturer in Computer Science, coordinated the program logistics.

EXPERT TALK SESSIONS

The One-day event featured engaging lectures by renowned resource persons, attended by approximately 70 participants, including students, and faculty from this institution.

The following topics are covered in the Expert talk.

1. Introduction to Quantum Computing

- Advanced computing paradigm based on principles of quantum mechanics
- Performs certain complex computations more efficiently than classical computers
- Uses quantum bits (qubits) instead of classical bits

2. Key Concepts

- Qubits
- Superposition
- Entanglement
- Quantum Interference
- High computational power

3. Working Principle

- Computation using qubits, quantum gates, and quantum circuits
- Parallel processing capability due to superposition
- Measurement collapses quantum states to classical outcomes

4. Applications of Quantum Computing

- Finance – Risk analysis and portfolio optimization
- Healthcare – Drug discovery and genomics
- Cybersecurity – Post-quantum cryptography
- Artificial Intelligence and Machine Learning
- Energy and Material Science

5. Case Studies and Industry Developments

- Advancements by IBM
- Research and innovations by Google
- Quantum annealing systems by D-Wave Systems
- Development of quantum processors and cloud-based platforms

6. Quantum Computing Architecture

- Types of qubits – Superconducting, Trapped Ions, Photonic
- Quantum Gates
- Quantum Circuits
- Quantum Control Systems

7. Quantum Algorithms

- Shor's Algorithm (Integer Factorization)
- Grover's Algorithm (Search Optimization)
- Quantum Fourier Transform
- Variational Quantum Algorithms

VALEDICTORY PROGRAMME

The Expert talk concluded with a valedictory session, graced by:

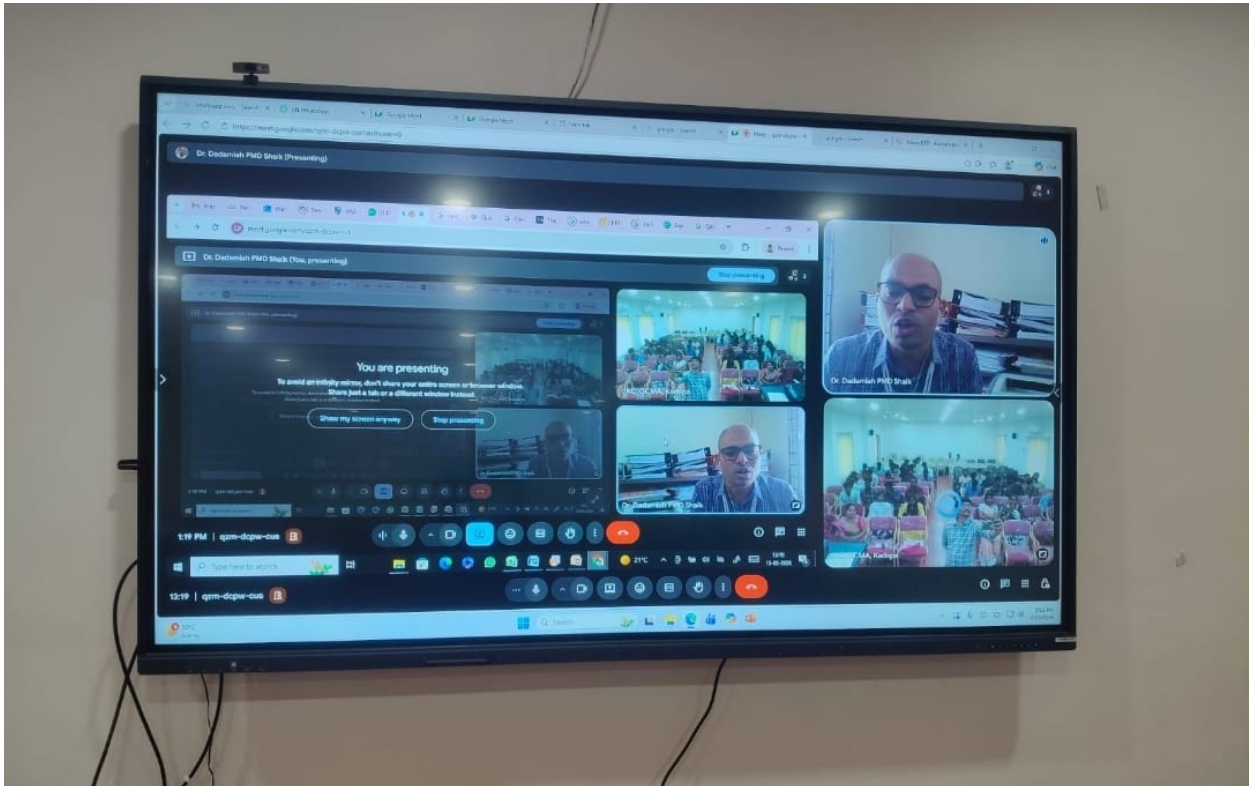
- **Speaker: Dr. DADAMIAH PMD SHAIK**, who praised the efforts of the organizers and participants for their enthusiasm and dedication.
- **Principal: Dr. M. Ravi Kumar**, who expressed gratitude to the resource persons and participants for making the Expert talk a success.
- **DBT-STAR Coordinator: Dr. Y. Savithri** highlighted the long-term benefits of such training programs.
- **Closing Remarks: Y. Anitha** summarized the outcomes of the Expert talk and encouraged participants to apply their newly acquired skills in their research endeavours.

CONCLUSION & OUTCOME:

The Expert Talk on Quantum Computing included an extensive theoretical discussion along with meaningful making the program highly interactive and fruitful. Around 70 students participated in this expert session and actively engaged in learning emerging Quantum technologies.

The participants were able to:

- Gain a deeper understanding of the fundamental principles of quantum mechanics related to computing.
- Comprehend key concepts such as qubits, superposition, entanglement, and quantum gates.
- Understand the working of quantum circuits and basic quantum algorithms.
- Differentiate between various quantum computing models and approaches.
- Explore major applications of Quantum Computing in cryptography, optimization, healthcare, finance, and artificial intelligence.
- Understand the practical challenges and theoretical limitations of Quantum Computing.
- Perform basic quantum circuit design and simulation using quantum programming platforms.





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Conclusion: The Quantum Journey Ahead

- Quantum computing, based on quantum mechanics, promises breakthroughs in cryptography, drug discovery, and AI.
- Major challenges such as decoherence and scalability are being tackled through global research and collaboration.

Preparing for the quantum era requires:

- Developing quantum-resistant encryption.
- Training skilled professionals in quantum technologies.
- Addressing ethical and societal implications of quantum advancements.



Dr. Dadamiah PMD is presenting



Trying to speak? Turn on your microphone.



