Dr. HILAL AHMAD BHAT
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Email: hilalbhat25@gmail.com
Address: Budgam, Jammu & Kashmir, India
Gender: Male
Category: General

Academic Details:

Examination	Institute	Percentage	Division
Ph.D (Electronics and Communication) **Thesis title**: Design and Implementation of Efficient Spin Quantum Computing Arithmetic Circuits	Department of Electronics and Instrumentation Technology, University of Kashmir, Hazratbal, Srinagar, India.	Awarded on 05-08-2024	Distinction in Course work
M.Sc (Electronics and Instrumentation Technology)	Department of Electronics and Instrumentation Technology, University of Kashmir, Hazratbal, Srinagar, India.	86.1	Distinction
B.E (Electronics and Communication)	University of Kashmir, Hazratbal, Srinagar, India.	76.3	Distinction
12^{th} (Science)	JKBOSE	82.1	Distinction
10^{th} (Genaral)	JKBOSE	84.2	Distinction

Competitive Examinations Qualified:

Examination	Discipline	Conducting Body	Year
National Eligibility Test (NET)	Electronic Science	University Grants Commission	2019
State Eligibility Test (SET)	Electronic Science	University Grants Commission	2018
GATE	Electronics and Communication Engineering	IIT Madras	2019
GATE	Electrical Engineering	IIT Roorkee	2017

Journal Publications:

- **Hilal. A. Bhat**, F. A. Khanday, B. K. Kaushik, F. Bashir and K. A. Shah, "Quantum Computing: Fundamentals, Implementations and Applications," in IEEE Open Journal of Nanotechnology, vol. 3, pp. 61-77, 2022, doi: 10.1109/OJNANO.2022.3178545.
- **Hilal. A. Bhat** and Farooq Khanday "Design and Modelling of Silicon Quantum Dot Based Single Qubit Spin Quantum Gates," International Journal of Theoretical Physics, 61, 258, 2022. https://doi.org/10.1007/s10773-022-05239-y
- **Hilal. A. Bhat**, F. A. Khanday, B. K. Kaushik and K. A. Shah, "Design and Analysis of 3x3 reversible quantum gates," Journal of Computational Electronics, 2022.
- **Hilal. A. Bhat**., Khanday, F.A. & Kaushik, B.K. Optimized quantum implementation of novel controlled adders/subtractors. Quantum Information Processing 22, 174 (2023). https://doi.org/10.1007/s11128-023-03896-4
- Mohmad Saleem Mir, **Hilal Ahmad Bhat** and Farooq Ahmad Khanday, "Efficient representation of bit-planes for quantum image processing," Multimedia tools and applications, Springer, 2024, https://doi.org/10.1007/s11042-024-18552-x
- **Hilal A. Bhat** and Farooq A. Khanday, "Harnessing the power of quantum computing circuit design tools," Physica Scripta, 2025.
- F. A. Zargar, **Hilal Ahmad Bhat,** M. A. Zarger, S.A Malik **"**Magnetic Nanoparticles in cancer Thermotherapy: A Mathematical Approach to Optimal Treatment Design," MatSciExpress, https://doi.org/10.69626/mse.2024.0115, ISSN: 2997-8440, 2024
- **Hilal A. Bhat** and Farooq A. Khanday "An Efficient Quantum Implementation of Reversible Latches," Quantum Studies: Mathematics and Foundations, 12 (1), 11, 2025, ISSN 21965617.

Conference Publications and Book Chapters:

- **Hilal. A. Bhat**, F. A. Khanday and K. A. Shah, "Optimal Quantum Circuit Decomposition of Reversible Gates on IBM quantum computer," 2022 5th IEEE International Conference on Multimedia, Signal Processing and Communication Technologies (IMPACT), Aligarh, India, 2022, pp. 1-4, doi: 10.1109/IMPACT55510.2022.10029250.
- **Hilal A. Bhat** and Farooq A. Khanday "Efficient reversible quantum implementation of combined half adder/subtractor," in International Conference on computational intelligence and biological sciences (ICCIBS 2023), 5th October 2023, pp. 340-343, ISBN – 978-93-5996-261-0
- **Hilal. A. Bhat**, F. A. Khanday and K. A. Shah, Optimal Circuit Decomposition of Reversible Quantum Gates on IBM Quantum Computers. In A. Tyagi (Ed.), Handbook of

Research on Quantum Computing for Smart Environments (pp. 149-164). IGI Global. https://doi.org/10.4018/978-1-6684-6697-1.ch008

Projects:

- Design and Simulation of Silicon based quantum dots.
- Efficient representation of bit-planes for quantum image processing.
- Microcontroller based Alcohol detection with automatic machine shutdown.
- Automatic traffic light with density controller and special vehicle passage.

Patents:

- Patent Granted : Portable Microcontroller based impedance meter for biological tissue analysis
- Filed Patent: Wearable device for personal safety, security and health monitoring.

Internships:

- Successful completion with merit of four months internship on “Quantum Computing” in Plexflo, Boulder, Colorado, USA.
- Successful completion with merit of one month course on “Quantum Computing using Indigenous Quantum Simulator QSim” jointly organized by IIT Roorkee and C-DAC Hyderabad with the support of Ministry of Electronics and Information Technology, Government of India in 2023.
- Winter internship at RTTC Rajpora Punjab from Feb 2017 to March 2017.
  - ✓ Studied BSNL network.
  - ✓ Optical fiber communication.
- Winter Internship at Power grid station Bemina Srinagar from Jan 2013 to Feb 2013.
  Studied Power System Network of J&K State and overview of following
  - ✓ Power System Network and Switching.
  - ✓ Automatic Control Engineering.
  - ✓ Electrical Machines.
- One year diploma in Advanced Computer Applications from NIELET.

Short term courses/Workshops:

- Attended an AICTE Sponsored Faculty Development Programme on "QUANTUM COMPUTING with Theme C2Q: FROM CLASSICAL TO QUANTUM SYSTEMS"

organized by the Department of Electronics & Communication Engineering, National Institute of Technology Srinagar from 25th - 29th June, 2022.

- One week Faculty Development Programme on "Artificial Intelligence: Devices to Circuits" conducted by the Electronics & ICT Academy, IIT Roorkee at Indian Institute of Technology Roorkee, 2020.
- Two weeks workshop in quantum computing at Islamic University of Science and Technology, Awantipora, J&K in 2019.
- Attended Online Course on Quantum Computing during 24-29 August 2020 jointly organized by NIT Patna and MNIT Electronics and ICT Academies.
- Attended one week workshop on Quantum Computing and Artificial Intelligence, organized by Cluster University Srinagar, India, 2020.
- Participated in the three day exchange idea program with international students, 2018
- Presented a seminar entitled Quantum dots and their Applications in combined session of SEEDS and 13th J&K Science Congress 2018.

Hardware Skills:

Analog Electronics, VLSI, Electrical Machines, CMOS design, Analog and Digital Communication Systems, Power Electronics, PCB Designing, Microprocessors and Microcontrollers, Digital ICs, Computer Security, FPGA, Aurdino, PIC, Supply Design,

Software Skills:

QISKIT, QUTIP, QKCircuits, QISKIT Metal, Cadence Virtuoso, PYTHON, MATLAB, HSPICE, C-Programming, PROTEIUS, MULTISIM, ARDUINO, LT Spice, ATLAS TCAD, IBM Quantum Experience, PCB Designing, FPGA, EDA, Eagle, LabView, Kiel, VHDL.

Awards and achievements:

- Awarded prestigious Maulana Azad National Fellowship (**MAN-JRF**) in Electronic Science by University Grants Commission (UGC), Government of India in 2019 for Ph.D Programme.
- Awarded Merit scholarship in Bachelors and Masters programme.
- Received **Best Paper Award** in 5th IEEE conference IMPACT-2022.

Areas of interest:

- Quantum Technology

- Analog Electronics.
- Semiconductor Physics.
- Quantum Computing.
- CMOS design.
- VLSI
- Nanotechnology.
- Quantum Dots and QCA.
- Digital Electronics.
- Electromagnetic Theory
- Linear Integrated Circuits
- Quantum Physics
- Analog and Digital Communication
- Electrical Machines
- Electronic Instrumentation
- Material Science
- Control System
- Network Analysis

References:

- Dr. Farooq Ahmad Khanday, Associate Professor, University of Kashmir, Srinagar, India, Email: farooqkhanday@kashmiruniversity.ac.in
- Dr. Shabir Ahmad Parrah, Associate Professor, University of Kashmir, Srinagar, India, Email: shabirparah@kashmiruniversity.ac.in
- Prof. Brajesh Kumar Kaushik, Professor, IIT Roorkee, India, Email: bkk23fec@iitr.ac.in
- Dr. Khurshed Ahmad Shah, Assistant Professor, Cluster University Srinagar, India, Email: drkhursheda@gmail.com
- Dr. Faisal Bashir, Assistant Professor, King Faisal University, Saudi Arabia Email: famed@kfu.edu.sa

Miscellaneous:

- **Hobbies:** Volley Ball, Cricket, Travelling, Fishing and Photography.
- **Languages Known**: English, Hindi, Urdu and Kashmiri.

Disclaimer: I hereby declare that all the above information is true to the best to my knowledge .

Place: Magam, Srinagar, J&K HILAL AHMAD BHAT