Dr. Neeru Chaudhary

Associate Professor
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Research Profile

Dr. Neeru Chaudhary is an experimental physicist working in the field of **solid-state physics and semiconductor materials**. Her research focuses on the **synthesis, electrical and optical characterization of nanocrystalline semiconductor materials**, with applications in **photovoltaics, optoelectronic devices, sensors, and energy materials**. Her work explores **silicon nanowires, thermoelectric materials, and Perovskite materials** emphasizing their fundamental properties and device applications.

She has international research experience as a **Visiting Professor at the University of Waterloo, Canada**, where she worked on **perovskite solar cell materials and device stability**. Her research contributions include more than **30 publications in international journals and conference proceedings**.

Research Interests

- Experimental Solid-State Physics
- Semiconductor Nanostructures and Nanocrystalline Materials
- Silicon Nanowires and Quantum Confinement Effects
- Photovoltaic Materials and Solar Energy Devices
- Optoelectronic Materials and Devices
- Thermoelectric Materials
- Electrical and Optical Characterization of Semiconductor Thin Films

Education

Ph.D. (Engineering & Technology)
Panjab University Chandigarh
2012 – 2017

Thesis:
Electrical characterization of nanocrystalline and amorphous semiconductors under different stresses and their optoelectronic properties.

M.E. (Instrumentation Engineering)
Panjab University Chandigarh
1999 – 2001

B.E. (Instrumentation Engineering)
Dr. Babasaheb Ambedkar Marathwada University
1995 – 1999

Academic Appointments

Associate Professor

Department of Physics
Panjab University Chandigarh
2010 – Present

Responsibilities include teaching, research supervision, curriculum development, and academic administration.

Courses taught include:

- Microprocessors and Microcontrollers
- Digital Electronics
- Digital Signal Processing
- Analog Electronics
- Electricity and Magnetism
- Electronics and network theory

Supervision:

- PhD research scholars in **silicon nanowires, thermoelectric materials and Perovskite materials**
- Supervised **80+ undergraduate and postgraduate research projects**

Academic leadership:

- President, Physics Association
- Member of departmental committees including Admissions, Career Counselling, Purchase and Anti-Ragging.

Administrative roles:

- Member, Research Degree Committee
- Member, PG Admission Committee
- Member, Academic Committee
- Coordinator, Teaching Laboratories
- Centre Superintendent, End Term Examination

Visiting Professor

Department of Mechanical and Mechatronics Engineering
University of Waterloo, Canada
2022 – 2024

Research focus:

- **Perovskite solar cells and photovoltaic materials**
- Stability improvement of perovskite devices

Research activities:

- Fabrication and characterization of photovoltaic devices
- Operation of advanced equipment including **thermal evaporator, glove box, EQE setup, and UV-visible spectrometer**
- Collaboration with interdisciplinary research teams in materials science and device physics.

Lecturer / Dean Academics

Punjab Technical University affiliated institutes, Punjab
2001 – 2010

Roles included:

- Lecturer in Instrumentation and Electronics
- Dean Academics
- Head of Department

Responsibilities:

- Teaching core engineering courses including Control Systems, Programmable Logic Controllers, Optical Fibre Communication, Microprocessors and Power Electronics
- Laboratory development and equipment management
- Academic administration including curriculum planning and examinations.

Research Projects (Funded)

1. ANRF PAIR Grant

   Funding Agency: Anusandhan National Research Foundation (ANRF)

   Project: *PAIR (Partnerships for Accelerated Innovation and Research) Grant*

   Role: Co-Investigator

   Focus: Dynamic research ecosystem for advanced materials (DREAMS)

2. Panjab University Alumni Grant

   Funding Agency: Panjab University Chandigarh

   Project: *The Synthesis and Preliminary Characterizations of Eco-Friendly Lead-Free Perovskite Materials for Photovoltaic Application*

   Role: Principal Investigator

3. Short term Research Project: Department of Science & Technology and Renewable Energy
   Funding Agency: Department of Science and Technology & Renewable Energy Department, Chandigarh
   Project Area: *Synthesis and characterization of Lead-free perovskite materials for energy harvesting applications*
   Role: Principal Investigator

Google Scholar Profile:

https://scholar.google.com/citations?user=shSVSZkAAAAJ&hl=en

Technical Expertise

- Thermal Evaporation Systems
- Glove Box for controlled fabrication environments
- External Quantum Efficiency (EQE) measurement systems
- UV-Visible Spectroscopy
- Semiconductor device characterization techniques
- Arduino platforms

Professional Memberships

- Member: Indian Society for Technical Education (ISTE)
- Member: Indian Association of Physics Teachers (IAPT)
- Member: Punjab Academy of Sciences (PAS)

Academic Service

- Member, Board of Studies, Electronics & Communication Engineering, Panjab University (2015–2017)
- Former Program Officer, National Service Scheme (NSS)
- Mentor for DST INSPIRE Internship Programme
- Invited talks