Dr. Chandra Prakash Singh

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Indian Institute of Technology Patna – Ph.D. Patna, India.
02/01/2019-21/02/2024

RESEARCH/INDUSTRIES EXPERIENCES

1. **Institute Postdoc Fellow, Indian Institute of Technology, IIT (ISM), Dhanbad, Jharkhand, India.**
   (From 26 July 2024 to 25 March 2025).
   Responsibility: - Design and Development of Smart Gas sensor (E-Nose) using Memristor Based Neuromorphic Computing.

2. **Senior Project Associate, Indian Institute of Science, IISc (CeNSE), Bangaluru, Karnataka, India.**
   (From 24 May to 25 July 2024 ~ 2 Months).
   Responsibility: - Design and Fabrication of Nano-Scale devices for Back Contact Solar Cell and Light Assisted Memristor devices by using Photo and E-beam Lithography.

3. **Project fellow, Indian Institute of Technology, IIT Patna, Bihar, India.**
   (From 22 Feb to 20 May 2024 ~ 3 Months).
   Responsibility: - Design and Development of Perovskite Based Memristor for Neuromorphic Applications.

4. **Embedded Design Intern, Bit Mapper Integration Technology Pvt. Ltd., Pune, India.**
   (From 1 May 2017 to 30 April 2018 ~ 1 Year).
   Responsibility: - I worked on Memory Mapping, Power Budget, High speed data transfer length matching, and clock signal mapping for FPGA based multilayer PCB embedded system.

RESEARCH INTERESTS

Design and Fabrication of Nano-scale thin film-based electronics devices Such as:

- **Neuromorphic Device (Resistive switching device).**
- **Gas Sensors devices (E-Nose).**
- **Photo sensitive devices.**
- **Solar cell.**

Modelling and simulation of semiconductor devices.

TEACHING INTERESTS

1. Semiconductor Device Physics.
2. Digital and Analog Circuit and System Design.

EDUCATION

Indian Institute of Technology
Patna, India (02/01/2019 – 21/02/2024)

Doctor of Philosophy: Electrical Engineering
Thesis Title: Design, Fabrication and Analysis of Metal-oxide Based Resistive Switching Device.
Cumulative Performance Index: 8.38/10.0

National Institute of Technology
Sikkim, India (07/2016 - 06/2018)

M.Tech: Microelectronics & VLSI Design.
Thesis Title: Designing of MOS Quadrupler-Based RF Harvesting Circuit.
Cumulative Performance Index: 8.59/10.0

Rajasthan Technical University
Kota, India (07/2011 - 07/2015)
M.L.V. Textile and Engineering College

B. Tech: Electronics and Communication Engineering.
Percentage: 68.06%

SKILLS

Device Fabrication and Characterization Tool:

(a) E-beam & Thermal evaporation thin film deposition.

(b) CVD thin film deposition.

(c) Sputtering thin film deposition.

ACTIVITIES

1. IEEE Electron Devices Society, Member, 2019-Present
2. Post-graduate Representative (PGR) of IIT Patna Student Gymkhana.
3. IEEE NTC Student Chapter IIT Patna Secretary (2022)
4. IEEE NTC Student Chapter IIT Patna Chair (2023)

ACHIEVEMENTS

1. GATE Qualified 2016,2017, and 2018.
2. NET Qualified 2019.
3. Poster Presentation runner-up in 2023 RSD (Research Scholar Day) Indian Institute of Technology Patna.
4. NSD-RSD 2024 IIT Patna Organizing Head.

PUBLICATIONS

Peer-Reviewed Journals:

1. **Chandra Prakash Singh,** Vivek Pratap Singh, Harsh Ranjan, and Saurabh Kumar Pandey, " Bipolar and Rectifying Resistive Switching Dynamics in E-beam evaporated SnOx Based Memristor" In ***Ceramic International***, vol. 50(2), pp. 4092-4100, Jan. 2024, Elsevier, SCI-Indexed, ISSN/eISSN- 0272-8842/1873-3956. **[I.F- 5.2]**
2. **Chandra Prakash Singh,** Vivek Pratap Singh, Harsh Ranjan, and Saurabh Kumar Pandey. "Performance Analysis and Read Voltage Optimization of E-Beam Evaporated Amorphous SnO2-Based Cross-Cell Resistive Switching Device," In ***IEEE Transactions on Electron Devices***, vol. 70(12), pp. 6637-6643, Dec. 2023, IEEE, SCI-Indexed, ISSN/eISSN- 0018-9383 / 1557-9646. **[I.F- 3.1]**
3. **Chandra Prakash Singh,** Vivek Pratap Singh, Harsh Ranjan, and Saurabh Kumar Pandey, "Investigation of resistive switching dynamics in e-beam evaporated P-type tin-oxide based cross-cell memristor for synaptic and memory application." In ***Materials Letters***, vol. 352, pp. 135156, Dec. 2023, Elsevier, SCI-Indexed, ISSN/eISSN- 0167-577X / 1873-4979. **[I.F- 3.0]**
4. **Chandra Prakash Singh**, Raghvendra, and Saurabh Kumar Pandey, "An efficient and flexible window function for a memristor model and its analog circuit application." In ***Journal of Computational Electronics***, vol. 21(6), pp. 1425-1433, Dec 2022, Springer, SCI-Indexed, ISSN/eISSN- 1569-8025 / 1572-8137. **[I.F- 2.1]**
5. **Chandra Prakash Singh**, and Saurabh Kumar Pandey, " "Performance Analysis of Forming Free Switching Dynamics of e-Beam Evaporated SnOx Based Resistive Switching Device," In ***IEEE Transactions on Electron Devices***, vol. 69(5), pp. 2686-2691, May 2022, IEEE, SCI-Indexed, ISSN/eISSN- 0018-9383 / 1557-9646. **[I.F- 3.1]**
6. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, and Saurabh Kumar Pandey, "Investigation of analog resistive switching dynamics in microwave-assisted Fe_3O_4 based memristor for neuromorphic application." In ***Materials Letters***, vol. 344, pp. 134431, Aug. 2023, Elsevier, SCI-Indexed, ISSN/eISSN-0167-577X / 1873-4979. **[I.F- 3.0]**

(d) Spin-Coating thin film deposition.

(e) Materials synthesis.

(f) XRD Analysis.

(g) EDX Analysis.

(h) FE-SEM Analysis.

(i) UV-Vis Analysis.

(j) PL Analysis.

(k) E-beam & Photo Lithography.

(l) Reactive-Ion-Etching (RIE).

(m) Keithley 2450 source Meter.

(n) Keithley 4200 Parametric Analyzer.

(p) Keysight B1500A Parametric Analyzer.

Coding, Computational and Simulation Tool:

(a) Verilog

(b) C-language

(c) Python

(d) VHDL

(e) MATLAB

(f) Origin

(g) MS Office

(h) COMSOL Multiphysics

7. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, and Saurabh Kumar Pandey, "Investigation of Analog Resistive Switching in Solution-Processed Lead-Free Perovskite Cs_2SnI_6 Memristor for Synaptic Application." In ***IEEE Transactions on Electron Devices,*** vol. 70(10), pp. 5092-5098, Oct 2023, IEEE, SCI-Indexed, ISSN/eISSN- 0018-9383 / 1557-9646. **[I.F- 3.1]**
8. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, and Saurabh Kumar Pandey, "Experimental demonstration and analysis of crossbar array memristor for brain-inspired computing." In ***Applied Materials Today***, vol. 36, pp. 102045, Feb 2024, Elsevier, SCI-Indexed, ISSN/eISSN- 2352-9407. **[I.F- 8.3]**
9. Nilesh Jaiswal, Vivek Pratap Singh, **Chandra Prakash Singh**, Deepak Punetha, and Saurabh Kumar Pandey, "Development of Solution-Processed Eco-Friendly Cs_2SnI_6 Double Perovskite Thin-Film Solar Cell." In ***IEEE Journal of Photovoltaics***, vol. 14(2), pp. 265-271, March 2024, IEEE, SCI-Indexed, ISSN/eISSN- 2156-3381 / 2156-3403. **[I.F- 3.74]**
10. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, Gaurav Kumar, Jyoti Jaiswal, Saurabh Kumar Pandey "Fabrication perspective of Fe3O4-based cross-cell memristive device for synaptic applications." In ***Current Applied Physics,*** vol. 63, pp. 48-55, July 2024, Elsevier, SCI-Indexed.
11. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, K Harikrishnan, Saurabh Kumar Pandey " Experimental Investigation and Performance Analysis of V_2O_5-Based Memristive Devices for Brain-Inspired Computing. "In ***IEEE Transactions on Electron Devices,*** vol. 71(9), pp. 5744 - 5753, September 2024, IEEE, SCI-Indexed, ISSN/eISSN- 0018-9383 / 1557-9646. **[I.F- 3.1]**
12. Harsh Ranjan, **Chandra Prakash Singh**, Vivek Pratap Singh, Saurabh Kumar Pandey " Self-rectifying and forming-free resistive switching with Cu/BN/SiO2/Pt bilayer device. "In ***Materials Science in Semiconductor Processing,*** vol. 183, pp. 108744, November 2024, Elsevier, SCI-Indexed.

International Conferences:

1. **Chandra Prakash Singh,** Saurabh Kumar Pandey, and Jawar Singh, "Body Connection Assessment of MOS-Diodes for MOS-Quadrupler based RF Energy Harvesting Circuit." In *2021 Devices for Integrated Circuit (DevIC)*, pp. 134-138. IEEE, 2021.
2. Harsh Ranjan, **Chandra Prakash Singh**, Vivek Pratap Singh, and Saurabh Kumar Pandey, "Analysis of Resistive Switching Mechanism in Hexagonal Boron Nitride 2D Material Based Memristive Device." In *2023 IEEE 23rd International Conference on Nanotechnology (NANO)*, pp. 359-362. IEEE, 2023.
3. **Chandra Prakash Singh**, Vivek Pratap Singh, Harsh Ranjan, Abhishek Gupta, and Saurabh Kumar Pandey, "A comparative study of an Exponential Window function for Linear Drift Memristor Model." In 2023 IEEE Silchar Subsection Conference (SILCON), pp. 1-4. IEEE, 2023.
4. Vivek Pratap Singh, **Chandra Prakash Singh**, Harsh Ranjan, Saurabh Kumar Pandey, " Synthesis and Characterization of Iron Oxide Nanoparticles for Bio-Medical and Neuromorphic Computing Applications." In *2024 International Conference on Smart Grid and Energy (ICSGE)*, pp. 38-42. IEEE, 2024.