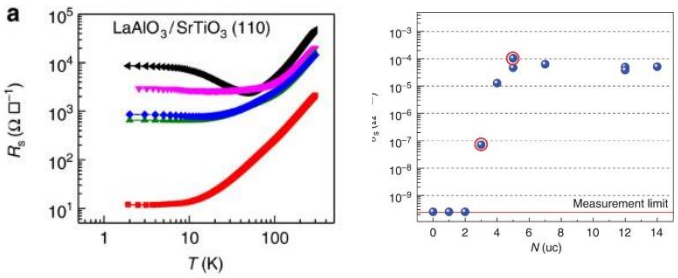
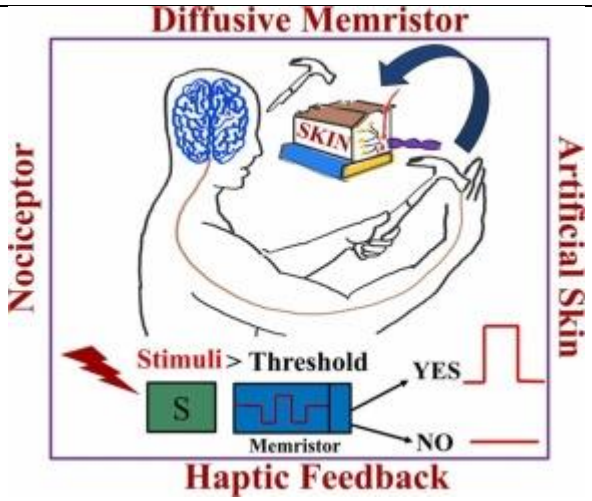
Item	Details
Faculty Name:	Dr. Amar Srivastava
Room No:	Cabin No: 125
Designation:	Assistant Professor
Contact No & E-Mail	7985231998, shriamar-phy@dsu.edu.in, amariitk09@gmail.com
Research Area:	Condensed Mater Physics
Publications (Past 5 years)	1. Khemnani, Manish, Parth Thakkar, Aziz Lokhandvala, Bhawana Andola, Brijesh Tripathi, Yogesh Srivastava, **Amar Srivastava,** and Ankur Solanki. "BDAPbI4 Dion Jacobson Hybrid Perovskite-based Artificial Nociceptors on Biodegradable Substrate." **(Sensors and Actuators A: Physical, (2024): 115382) (Impact Factor: 4.89, Q1).** 2. Neetu Vishwakarma, Abhijith Ambadi Remadevi, Deepak Kumar, Ankur Solanki Abhimanyu Singh Rana, **Amar Srivastava*** ***"Metastable Marvels: Navigating VO_2 Polymorphs for Next-Gen Electronics and Energy Solutions"*** **(Journal of Applied Physics, 135, 2, 2024) (Impact Factor: 3.2, Q2).** 3. Neetu Vishwakarma, Tim Tim Mashangva, Mukesh Kumar, **Amar Srivastava*,** Ajit Sharma "Impact of Hydrothermal and Solvent-Thermal Synthesis on the Electrochemical Performance of Vanadium Oxide (V_2O_5)" **(Material Letter, (2024), 136137) (Impact Factor: 3.0, Q2).** 4. Vishwakarma, Neetu, Monika Sindhu, Karan Singh Maan, Sahima Tabasum, Suman Rani, Vijay Patel, Jashanpreet Singh, Amar Srivastava, and Ajit Kumar Sharma. "Preparation of vanadium oxide from various route of synthesis process for energy storage application." **(AIP Conference Proceedings, vol. 2800, no. 1. AIP Publishing, 2023).** 5. S Neema, AR Abhijith, OS Panwar, A Srivastava, A Rana "Tunable thermochromism in V_2O_5 films deposited by cathodic vacuum arc method by tailoring the oxygen deficiency" **(Journal of Physics: Conference Series 1531 (1), 012005, 2022) (Impact Factor: 0.54).** 6. AR Abhijith, A.K. Srivastava, **A Srivastava**, *"Synthesis and Characterization of Magnesium Doped ZnO Using Chemical Route"* **(Journal of Physics: Conference Series 1531 (1), 012005, 2020) (Impact Factor: 0.54).** 7. T. Tchouank Tekou Carol, **Amar Srivastava**, J. Mohammed, Shaweta Sharma, G. Mukhtar, A.K. Srivastava *"Investigation of energy band-gap of the composite of hexaferrites and polyaniline"* **(Springer Nature Applied Sciences, 2, 864, 2020) (Impact Factor: 2.9, Q2).** 1.

Sponsored Projects (Past and Ongoing)	
Profile Links : Scopus and Orcid	Orcid Link: https://orcid.org/0000-0003-1444-3497 Scopus Link: https://www.scopus.com/authid/detail.uri?authorId=57203137959
Research Activities (Write about your best research results max of 2-3 pages including diagrams)	I am a Ph.D. in experimental physics with 8 years of experience of teaching and leading a research group. I am interested in the research of Strongly Correlated Materials, Metal Oxide Thin Films for Energy, Sensing Devices and Application, Multiferroic Materials, Magnetic Materials & Interface Magnetism. Currently, we are engaged in developing battery electrode materials & sensor array platforms for portable devices, sensors for flexible electronic and new sensor device architectures for the selective detection of hazardous gases using CMOS compatible process.



- **Anisotropic 2-D electron gas at the LaAlO3/SrTiO3 (110) interface**: The observation of a high-mobility two-dimensional electron gas between two insulating complex oxides, especially LaAlO3/SrTiO3, has enhanced the potential of oxides for electronics. The occurrence of this conductivity is believed to be driven by polarization discontinuity, leading to an electronic reconstruction. In this scenario, the crystal orientation has an important role, and no conductivity would be expected, for example, for the interface between LaAlO3 and (110)-oriented SrTiO3, which should not have a polarization discontinuity. Here we report the observation of unexpected conductivity at the LaAlO3/SrTiO3 interface prepared on (110)-oriented SrTiO3, with a LaAlO3-layer thickness-dependent metal-insulator transition. Density functional theory calculation reveals that electronic reconstruction, and thus conductivity, is still possible at this (110) interface by considering the energetically favourable (110) interface structure, that is, buckled TiO2/LaO, in which the polarization discontinuity is still present. The conductivity was further found to be strongly anisotropic along the different crystallographic directions with potential for anisotropic superconductivity and magnetism, leading to possible new physics and applications.
- **Electrochemical performance of V_2O_5:** This research focuses on synthesizing vanadium oxide through hydrothermal and solvent-thermal methods, to explore their potential application in supercapacitors. X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FT-IR) are used to determine the crystalline size and functional group, while scanning electron microscopy (SEM) is used to investigate their morphologies. The electrochemical performance was evaluated through cyclic voltammetry (CV), galvanostatic charge–discharge (GCD), and electrochemical impedance spectroscopy (EIS). The results demonstrated that the V2O5 synthesized by the hydrothermal method exhibited

	two-fold increases in specific capacitance compared to those produced by the solvent-thermal method. Experimental results also indicate that nanoparticles V2O5 by hydrothermal can deliver a capacitance of 121 Fg−1 and solvent-thermal deliver a capacitance of 72 Fg−1 at the current density of 1 Ag−1 in the potential range from 0 to 0.45 V in a 3 M KOH aqueous electrolyte. ➢ **BDAPbI4 Dion Jacobson Hybrid Perovskite-based Artificial Nociceptors:** With the current evolution in artificial intelligence technology, biodegradable biomimetic devices are essential to execute increasingly complicated tasks and respond to challenging work environments. Consequently, the integration of artificial nociceptors holds considerable importance in enhancing the capabilities of humanoid robots. Low-dimensional Hybrid organic–inorganic Perovskites (HOIPs) show promise in emulating biological neurons owing to their inherent ion migration properties. In this work, we present Dion-Jacobson hybrid perovskite (BDAPbI4 (BDA=NH3C4H8NH3)) diffusive memristor on a paper substrate to serve as an artificial nociceptor. The symmetric electrode configuration as Paper/Ag/PCBM/BDAPbI4/PMMA/Ag demonstrates low operating voltage diffusive memristor with an ON/OFF ratio of ∼103. The surface investigation of device before top electrode deposition via X-ray photoelectron spectroscopy XPS and electrical characteristics of the complete device reveal the interplay between Schottky barrier at BDAPbI4/Ag interface and conductive filament formation/rupture within active layer as the origin of the abrupt resistive switching. The characteristics of the diffusive memristor resemble those of biological nociceptors, displaying sensitivity to external stimuli and key attributes such as threshold response, lack of adaptation, and relaxation. These findings underscore the potential application of Dion-Jacobson hybrid perovskites (BDAPbI4) as diffusive memristors in future neuromorphic intelligence systems.

	
Collaborations	•Dr. Himani Sharma, Doon University, Uttarakhand •Dr. Ankur Solanki, PDPU, Gandhinagar, Gujrat •Dr. Kavita, IIT Madras, Chennai, Tamilnadan •Dr. Abhimanyu Rana, BML Munjal University (BMU) •Dr. Amritendu Roy, IIT-Bhubaneswar
Invited Talks	**(1)** "**Resource Person NanoBiotech@DBT networking event on nano fertilizers**." Aug 02, 2019, at TERI-Deakin Nanobiotechnology Research Centre (TDNBC), Gwal Pahari, Gurugram, Haryana. **(2)** "**Workshop on Advanced Physics of Emerging Materials and Electronic Devices**" between 21-23 June 2021 at Department of Physics, Pandit Deendayal Energy University (PDEU) Gandhinagar. **Topic: X-ray Diffraction Method: Principles and Characterization of Advance Materials** **(3) "Jury members for the Open House 2023 on 4th November 2023, IIT Delhi",** **Event:** IIT Delhi's Open House-2023 **Venue:** Lecture Hall Complex (LHC), IIT Delhi New Delhi **Date/Time:** 04 Nov 2023 09:30 AM
Group Members (PhD Students and Projects) Open Positions: If any	A PhD position is open in Materials Design for Sensing and Battery Electrodes. Interested and eligible candidates may send their CV.