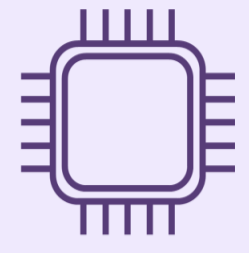


# SEMICONDUCTOR & ELECTRONICS

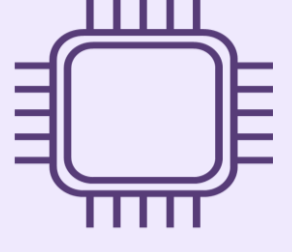
## (1 of 2)



### Patents Filed since 2023

This collection of IISc-led semiconductor innovations spans advanced materials, device architectures, manufacturing processes, and computing systems - from next-generation perovskites and 2D materials to high efficiency GaN HEMTs, spintronics, memristors, and nanophotonic platforms. Designed for industry collaboration, these patented technologies address critical challenges in energy efficiency, scaling, thermal management, and integration. Whether you seek breakthroughs in wide bandgap power devices, neuromorphic computing, RF MEMS, or printable optoelectronics, this portfolio offers ready to license opportunities. Each entry reflects cutting edge research with demonstrated lab scale viability. Explore below to identify technologies aligned with your product roadmaps and R&D goals.

IP Reference Number	IP Title	Faculty Inventor @ IISc
IDR-CeN-2025-097	A Novel Method to Prepare Blue Emitting Perovskite	Aditya Sadhanala
IDR-CeN-2025-095	Interface engineered Novel single atom GCN and COF hybrid electrocatalyst for the efficient OER and HER Reactions.	
IDR-CeN-2025-083	In situ conversion of semiconductor materials to ambipolar materials	
IDR-CeN-2025-056	Process to Manufacture Wide-Bandgap Perovskite Material	
IDR-CeN-2024-178	Atomic Layer Deposition of metal oxides, nitrides, and chalcogenides using solution precursors	
IDR-CeN-2024-169	Nanocrystal-Enhanced Surface Ion Management for High-Performance Perovskite Thin-Film Optoelectronics	
CS-SSCU-2025-126	Liquid Semiconductor Devices using Chalcogenide based solutions.	Anshu Pandey
MPS-PHY-2024-057	A scalable universal approach to improve the quality of metal contact to semiconductors via optically induced doping	Arindam Ghosh
MS-MAT-2025-205	Spintronic Logic Architecture in Single-Layer Ferromagnetic Oxide Thin Films	Bhagwathi Prasad
IDR-CeN-2025-211	Tunnelling Independent Non-volatile Negative Differential Resistance in Planar $\alpha$ -In <sub>2</sub> Se <sub>3</sub> Devices Controlled by Ferroelectric Polarization	Chandan Kumar
IDR-CeN-2025-041	Development of Molecular Beam Epitaxy Unit	Dhaval Suri
IDR-CeN-2025-057	Manufacturing methods for Fabricating Air Bridge Metal Interconnects	Digbijoy N Nath
IDR-CeN-2024-064	Gate dielectric and passivation on buffer-free III-nitride HEMTs and manufacturing methods thereof	
IDR-CeN-2024-056	Selective n-type doping of Gallium Oxide using amorphous silicon source and preparation method thereof	
IDR-CeN-2024-167	MULTIPLE LATERAL STACKING OF FERROELECTRIC AND PIEZOELECTRIC IN A RESONATOR	Gayathri Pillai
ES-EE-2025-134	Realtime simulation with nanoseconds timesteps resolution using general purpose multi-core processor systems	Gurunath Gurrula
IDR-CeN-2025-062	System and Method for Controlled Molecular Translocation in Angled Nanopores	Manoj Varma
IDR-CeN-2025-055	Nanopore Fabrication using Localized Dielectric Breakdown of Silicon Nitride Membranes via Atomic Force Microscopy Nanoindentation	
ES-DESE-2024-038	Robust stress engineered surface passivation for improved device performance and reliability in GaN HEMT.	Mayank Shrivastava
ES-DESE-2024-037	Gate Metallization Design for e-mode GaN HEMTs	
ES-DESE-2023-084	2D Semiconductors Based Analog Memory Device	
ES-DESE-2023-083	Graphene Heat Spreader	
ES-DESE-2023-082	Doping and Activation Scheme for 2D Semiconductors	
ES-DESE-2023-081	Dual and Triple Passivation Scheme for p-GaN Gate e-mode HEMTs	
ES-DESE-2023-080	Method to Tune Gate Work Function in p-GaN Gate e-mode HEMTs	
ES-DESE-2023-079	Method for High Threshold Voltage and High Breakdown Gate Stack in p-GaN Gate e-mode HEMTs	
ES-DESE-2023-078	Method of Making High Robustness E-mode High Electron Mobility Transistor	
ES-DESE-2023-077	Low Capacitance FinFET SCR	
ES-DESE-2024-176	Dual Gated, Low Capacitance and Low leakage Dual STI bounded Silicon Controlled Rectifier for STI bounded bulk planar technology	
ES-DESE-2024-175	Low Capacitance, Low leakage and Low Ron STI bounded Silicon Controlled Rectifier for STI bounded bulk planar technology	
ES-DESE-2024-164	Passivation Scheme for Radio Frequency High Electron Mobility Transistors.	
ES-DESE-2024-162	Method to Tune Holding Voltage in Silicon Controlled Rectifiers	
IDR-CeN-2025-200	Neurochaos Learning System Utilizing Memristor-Based Chaotic Dynamics	Pavan Nukala



### Patents filed since 2023

IP Reference Number	IP Title	Faculty Inventor @ IISc
MS-MAT-2025-140	Compo cast Al-11Si-0.25MWCNT composite, a continuous compo casting setup and process thereof	Prosenjit Das
MPS-IAP-2023-075	Pseudo-Threshold Thin Film Transistor	Sanjiv Sambandan
MPS-IAP-2025-104	Balanced Inverters with Tunable Threshold Transistors	
CS-SSCU-2024-048	Diketopyrrolopyrole-based Self-Assemble Monolayers (SAMs) for Optoelectronic Devices	Satish Patil
IDR-CeN-2024-156	A high-yield and phase-targeted synthesis method for functional oxides	Shivashankar S A
IDR-CeN-2025-159	Nanoferrites as materials for inductor cores in the MHz range	
IDR-CeN-2024-083	A New Method for Growth of Thick High-Quality AlN film on Si (111) for Piezo-MEMS Applications	Saurabh Chandorkar
IDR-CeN-2024-079	Novel Micro/Nano electromechanical ring oscillator with and without electronic components	
IDR-CeN-2023-131	Active nullification of Stray Charges on Floating Electrodes in Micro And Nano Electromechanical Resonators	
IDR-CeN-2023-135	Capacitively transduced Micro/Nano electromechanical resonator as a RF voltage amplifier	
IDR-CeN-2024-034	HIGH-RESOLUTION, 14- BIT PRECISION, SELECTORLESS, LINEAR AND SYMMETRIC, ANALOG COMPUTING SYSTEM	Sreetosh Goswami
IDR-CeN-2025-049	Memristor Crossbars as High-Bandwidth Memory for AI and Scientific Computing	
IDR-CeN-2024-145	Ultra High Density Non Volatile Memory using Molecular Materials	
IDR-CeN-2024-115	Multi metallic transition metal complexes for resistive and capacitive memory and non-linear dynamics	
IDR-CeN-2024-113	Polycyclic redox-active organic materials for electronic and optical switching applications	
IDR-CeN-2024-114	Heteroleptic transition metal complexes for capacitive memory and non-linear dynamics	
IDR-CeN-2025-118	Process for Epitaxial Deposition of GaN based HEMT Stacks on Sapphire substrates by MOCVD	Srinivasan Raghavan
CS-MRC-2026-011	Vacancy-Engineered Chromium Nitride Thin Films on Silicon Exhibiting Room-Temperature Metal-Insulator Transition and Carrier Polarity Switching	Sujit Das
CS-MRC-2026-006	Phase-pinning driven neuromorphic computing based on antiferroelectric PbHfO <sub>3</sub> thin films	
CS-MRC-2025-046	Oxygen vacancy controlled piezoelectric behaviour in SrTiO <sub>3</sub> on Si	
CS-MRC-2025-045	High mobility semiconducting nature and self-bias photodetection of CrNO integrated to Silicon	
CS-MRC-2024-068	Fabrication of Barium Strontium Titanate Tunable Capacitor Device	Sushobhan Avasthi
IDR-CeN-2025-026	Broadband Self-Powered Sb <sub>2</sub> Te <sub>3</sub> /MoTe <sub>2</sub> Heterostructure Photodetector for Infrared Detection	
IDR-CeN-2025-107	Using particle distribution to control and optimize the viscosity of perovskite inks for more efficient printable perovskite solar cells	
MPS-IAP-2025-036	Multiscale, Multi-Material 3D Lithography and Droplet-on-Demand Fabrication Technology for Optical, Electronic, and Packaging Applications	Tapajyoti Das Gupta
MPS-IAP-2025-094	High-Numerical-Aperture Metalens-Based Tabletop Lithography System for Direct Laser Writing	
MPS-IAP-2025-080	Multilevel Hybrid Encryption System Via Thermally Engineered Thin Film Functional Microstructures of Chalcogenide Glass for Ultimate Data Protection	
MPS-IAP-2024-137	Adaptive Temperature-Regulated Thin Film Surface Morphologies for Large-Area Soft Photonics	