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PRESS-RELEASE

IIT (ISM) Dhanbad Earns Spotlight at Semicon India 2025 with Indigenous Chip Design as PM Modi Launches National Semiconductor Mission

IIT (ISM) Dhanbad earned national recognition at Semicon India 2025 for the successful design and fabrication of an advanced integrated circuit, APEEC1, led by Dr. Rajeev Kumar Ranjan, faculty member of the Department of Electronics Engineering. The acknowledgment highlighted the institute's rising role in indigenous chip design and advanced semiconductor research.

The process of designing the circuit began in **2023** with an initial fund of **₹1.12 crore** provided by the **Ministry of Electronics and Information Technology (MeitY)**, the Government of India agency responsible for the development, promotion, and regulation of the electronics and IT industry, as well as digital governance and cybersecurity initiatives in the country.

Semicon India 2025 was inaugurated in New Delhi on **September 2, 2025**, by Prime Minister Narendra Modi, who described chips as the “digital diamonds of the 21st century” and underlined India's ambition to become a global hub for semiconductor innovation. In a landmark moment of the ceremony, Union IT Minister Ashwini Vaishnaw handed over India's first indigenous 32-bit microprocessor, **Vikram-32**, developed by ISRO's Semiconductor Laboratory, to the Prime Minister.

As part of this national celebration, the **APEEC1 chip** designed under Dr. Ranjan's leadership was spotlighted. Fabricated at the Semiconductor Laboratory (SCL), Mohali, via the ChipIN Centre, APEEC1 is a **low-power analog memristor emulator** created to replicate the behavior of biological synapses. By enabling advanced learning mechanisms such as **Spike Density Dependent Plasticity (SDDP)**, it supports next-generation **neuromorphic computing, spiking neural networks, crossbar arrays, and edge AI devices**. Operating efficiently between **1 MHz and 30 MHz**, it offers high performance with low energy consumption, making it suitable for **real-time adaptive learning systems**.

Reflecting on the achievement, Dr. Ranjan remarked:

“This chip is a small yet meaningful step toward India's vision of semiconductor self-reliance. It demonstrates how academic research can transform into tangible silicon with real-world impact.”

With over **350 exhibitors from 33 countries**, including global CEOs, researchers, and startups, Semicon India 2025 showcased India's growing capabilities in the semiconductor ecosystem. The recognition of IIT (ISM) Dhanbad's contribution on such a prestigious platform reinforced the institute's commitment to supporting India's journey towards **technological independence and global leadership in semiconductor innovation**.

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