



Embassy of India, Berne

# INDIA SCIENCE AND INNOVATION WEEKLY

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*Ask the right questions, and nature will open the door to her secrets  
- Dr. C.V. Raman, The Nobel Prize in Physics 1930*

## IISc Developed an AI Tool to Identify the Median Nerve in Ultrasound Videos

Scientists at the Indian Institute of Science (IISc), in collaboration with Aster-CMI Hospital, developed an AI tool that could identify the median nerve in ultrasound videos and detect carpal tunnel syndrome (CTS). CTS arises when the median nerve, which runs from the forearm into the hand, is compressed at the carpal tunnel part of the wrist, resulting in numbness, tingling or pain. To develop the tool, the team turned to a machine learning model based on transformer architecture, similar to the one powering ChatGPT. The model was originally developed to detect dozens of objects simultaneously in YouTube videos. The team stripped the model's computationally expensive elements to speed it up, and cut down the number of objects it could track to just one – the median nerve, in this case.

## IIT Kanpur Established New Milestones in Research & Innovation

Indian Institute of Technology (IIT) Kanpur established new milestones in Research & Innovation by filing 122 Intellectual Property Rights (IPRs) and achieving an exceptional licensing rate of around 14% to industry partners in 2023. IPRs filed included 108 patents, 4 design registrations, 3 copyrights, and 1 trademark application, along with 4 US and 2 China patents. IIT Kanpur secured top position in NIRF 2023 in Innovation category and the Best Assisted Technology Initiatives by Educational Institutes' at ATF Awards 2023.

## IISc Researchers Studied How Different Types of Cancer Cells Respond to IFN- $\gamma$ Activation

Researchers at the Indian Institute of Science (IISc), in a new study tried to understand how different types of cancer cells respond to IFN- $\gamma$  activation. Researchers found that only some types of cancer cells respond well to IFN- $\gamma$  activation, while others don't. They also suggested some approaches that could be used to make these non-responsive cancer cells better respond to immunotherapy. The team found that cancer cell lines derived from the liver and the kidney showed increased production of nitric oxide (NO) and lactic acid upon IFN- $\gamma$  activation. This, in turn, increased the production of toxic reactive oxygen species (ROS) leading to oxidative damage, which eventually kills the cancer cells. They found that the higher amounts of lactic acid produced in the cell culture medium was due to increased glycolysis, a series of chemical reactions that extracts energy from glucose.

## IIT Guwahati Designed an Affordable and Efficient 'Passive' Radiative Cooling System

Scientists and researchers at the Indian Institute of Technology (IIT) Guwahati designed an affordable and efficient 'passive' radiative cooling system that does not require electricity to operate. This 'Radiative Cooler' coating material is an 'electricity-free' cooling system as it could be applied on the rooftops and functions both during day and night time to provide an alternative to conventional air-conditioners. Passive radiative cooling systems operates by emitting the heat absorbed from the surrounding in the form of infrared radiations that can pass through the atmosphere before getting dumped into the cold outer space.

## Special Update: Successful Flight Trial of Autonomous Flying Wing Technology Demonstrator

Defence Research and Development Organisation (DRDO) successfully carried out a flight trial of Autonomous Flying Wing Technology Demonstrator, an indigenous high-speed flying-wing Unmanned Aerial Vehicle (UAV) from the Aeronautical Test Range in Karnataka. The successful flying demonstration of this autonomous stealth UAV is a testimony to maturity in the technology readiness levels in the country. With this flight in the tailless configuration, India has joined the elite club of countries to have mastered the controls for the flying wing technology. This UAV is designed and developed by DRDO's Aeronautical Development Establishment. The aircraft prototype, with a complex arrowhead wing platform, is designed and manufactured with light-weight carbon prepreg composite material developed indigenously. Also, the composite structure, impregnated with fibre interrogators for health monitoring, is a showcase of 'Aatmanirbharta' in the aerospace technology.