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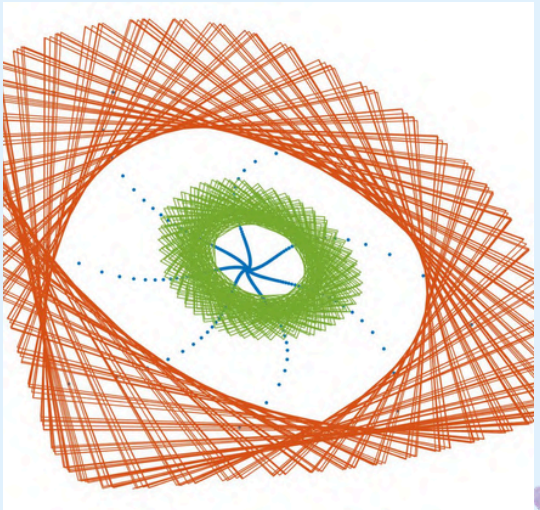
Understanding Schizophrenia through Chaos-Driven Dynamics: A Collaborative Breakthrough by IIT Bhubaneswar and NIMHANS, Bangalore

In a significant interdisciplinary research collaboration, scientists from NIMHANS Bangalore, and IIT Bhubaneswar have developed a novel approach to understanding schizophrenia using chaos-driven dynamical systems. This pioneering study offers promising insights into brain function, disease progression, and potential treatment pathways for one of the most complex mental health disorders.

Mental health disorders affect nearly 15% of the global population, with schizophrenia being among the most severe due to its disabling symptoms and early onset, typically during late adolescence or early adulthood. This timing significantly impacts individuals during their most productive years. Understanding the biological and neural mechanisms underlying such disorders is essential for early diagnosis and the development of effective treatments.

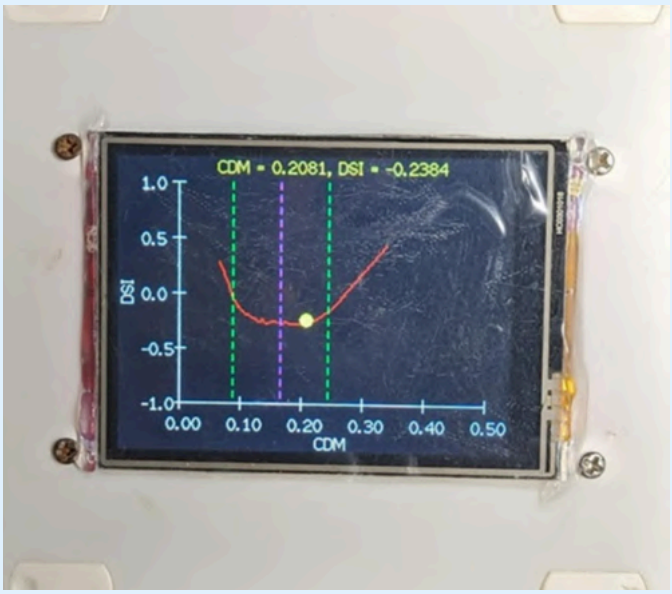
Modern neuroscience recognizes mental illnesses as brain-based conditions involving dysfunction in neural networks, neurotransmitter imbalances, and structural abnormalities. To study these complexities, the research team employed functional magnetic resonance imaging (fMRI), a technique that measures brain activity by detecting changes in blood oxygen levels - known as the blood-oxygen-level-dependent (BOLD) signal.



The study focused on resting-state fMRI (rs-fMRI) signals to examine brain network dysfunction and synchronization patterns. These signals were analyzed using a specially designed chaotic dynamical system Each patient's brain signal uniquely influenced the system, enabling researchers to observe how brain activity evolves over time and responds to treatments such as antipsychotic medications, transcranial magnetic stimulation (TMS), and electroconvulsive therapy (ECT).

A key innovation of this research is the development of a Chaotic Dynamics Marker (CDM), which can assess disease recovery and guide treatment strategies. Notably, the study revealed that beyond a certain threshold, some treatments may have opposite effects on brain excitation, offering critical insights for personalized medicine.

The research introduces a unique dynamical system named U-KBBC, developed collaboratively by experts across psychiatry (at NIMHANS), and chemistry, materials engineering, electronics engineering and high performance computing at IIT BBSR. This system produces a distinct attractor pattern named “Sudarshan,” which changes shape based on individual brain signals. These variations generate patient-specific markers, including CDM and a synchronization measure (SyncSZ), enabling detailed tracking of disease assessment, progression, and recovery.



The team at IIT BBSR also developed a portable electronic device, “Chinmoy,” embedded with the U-KBBC system, enhancing the potential for real-world clinical applications. A joint patent has been filed by NIMHANS Bangalore and IIT Bhubaneswar to protect this innovation.

This study is the first of its kind globally and represents a major step toward integrating advanced chaotic dynamics based models with clinical neuroscience. While the findings are promising, further validation through large-scale studies is underway. Beyond schizophrenia, the application of chaotic dynamics is expanding into other medical domains, including depression, epilepsy, cancer, and cardiovascular disorders.

This collaboration exemplifies the power of multidisciplinary and multi-institutional research in addressing complex health challenges. The team aims to extend this work across medical institutions in India and globally, contributing to improved diagnosis, treatment, and understanding of mental health disorders.

Distinguished Visitors

H.E. Chris Cooter, High Commissioner, Canada; Ms Karen Joan Blumenschein, High Commissioner's spouse; Mr. Rohit Shukla, Political - Economic and Public Affairs Officer, High Commission of Canada; Arjun Kumar Dutta, Trade Commissioner, High Commission of Canada, visited IIT Bhubaneswar on 8th May 2026.

The visit included discussion with Director and Deans on deepening academic/research collaboration, and with relevant faculty on Hydrogen hub focussed on cement and steel. They also interacted with students on educational and R&D opportunities in Canada

IIT Bhubaneswar Launches Industry-Linked M.Tech Programme in 'Cybersecurity' for Engineers working in Industries

IIT Bhubaneswar has announced the launch of industry-linked M.Tech Programme in Cybersecurity, developed in strategic association with WhizHack Technologies, one of India's leading cybersecurity training and simulation companies. Designed specifically for working professionals, the blended-mode programme combines academic learning with hands-on industry exposure to equip learners with advanced cybersecurity skills required to address emerging digital threats across industries and government sectors.

The programme has been introduced in response to the growing demand for skilled cybersecurity professionals across critical infrastructure, finance, governance, defence, and enterprise security. The flexible blended-mode structure integrates online learning with focused on-campus immersion, enabling professionals to pursue higher education while continuing their careers. Notably, admission to the programme does not require GATE qualification, with selection based on academic background and professional experience

The curriculum is designed to provide comprehensive knowledge in secure system design, cyber risk assessment, governance and compliance, AI-driven security, blockchain security, and advanced attack-defence strategies. Participants will gain practical exposure through hands-on cyber labs and real-world simulations of industry-grade Cyber Range technology. The programme also emphasizes strategic cybersecurity management and industry-oriented research to prepare professionals for leadership roles in the rapidly evolving cybersecurity ecosystem.

The programme reflects IIT Bhubaneswar's emphasis on combining foundational science with real-world impact, while addressing cybersecurity as one of the most critical frontiers of the digital era through a transformative and industry-oriented learning approach.

The programme is scheduled to commence on 24th July 2026, with applications currently open for eligible candidates from industry and related sectors who aspire to advance their careers in cybersecurity through this innovative and flexible learning model.

IIT Bhubaneswar signs MoU with NFSC Nagpur

IIT Bhubaneswar has signed an MoU with National Fire Service College (NFSC), Nagpur, an institution under the Ministry of Home Affairs, Government of India, to strengthen collaboration in education, research, innovation, and capacity building in the field of fire engineering and safety.

The MoU was formally exchanged between Prof. Shreepad Karmalkar, Director, IIT Bhubaneswar, and Dr. Anant R. Sontake, Professor and Director, NFSC on 5th May 2026 at IIT Bhubaneswar. in the presence of officials and faculty members from both institutions, including Prof. Dinakar Pasla, Dean (Sponsored Research and Industrial Consultancy); Prof. Arun Kumar Pradhan, HoS (School of Mechanical Sciences); Prof. Swarup Kumar Mahapatra; Dr. Amrit B. Sahu; Dr. Prasenjit Rath; and Dr. Yogesh G. Bhumkar from IIT Bhubaneswar, along with Shri N. Aravindan from NFSC.

Under this collaboration, both institutions will jointly pursue research and development activities, faculty and student exchange programs, co-supervision of student projects and dissertations, development of academic training programs, and externally funded research and consultancy initiatives in the areas of fire safety, firefighting technologies, disaster-resilient systems, and other allied domains. The MoU also establishes a framework for undertaking projects supported by government agencies, public sector undertakings, industries, and international organizations.

This collaboration has been guided and approved by Shri Sunil Kumar Jha, Director General (FS, CD & HG), Ministry of Home Affairs, Government of India, reflecting the Ministry's emphasis on strengthening academic and research capabilities in fire safety and disaster resilience.

Inauguration of Indian Institute of Metals (IIM) Student Affiliate Chapter

Faculty members and undergraduate students from School of Minerals, Metallurgical and Materials Engineering at IIT Bhubaneswar with Prof. B.S. Murty, Director IIT Hyderabad and IIM President at the inauguration of IIM Student Affiliate Chapter (affiliated to IIM Bhubaneswar Chapter). The inauguration ceremony was held at Indian Institutes of Science Education and Research (IISER) Berhampur on 11th April 2026.

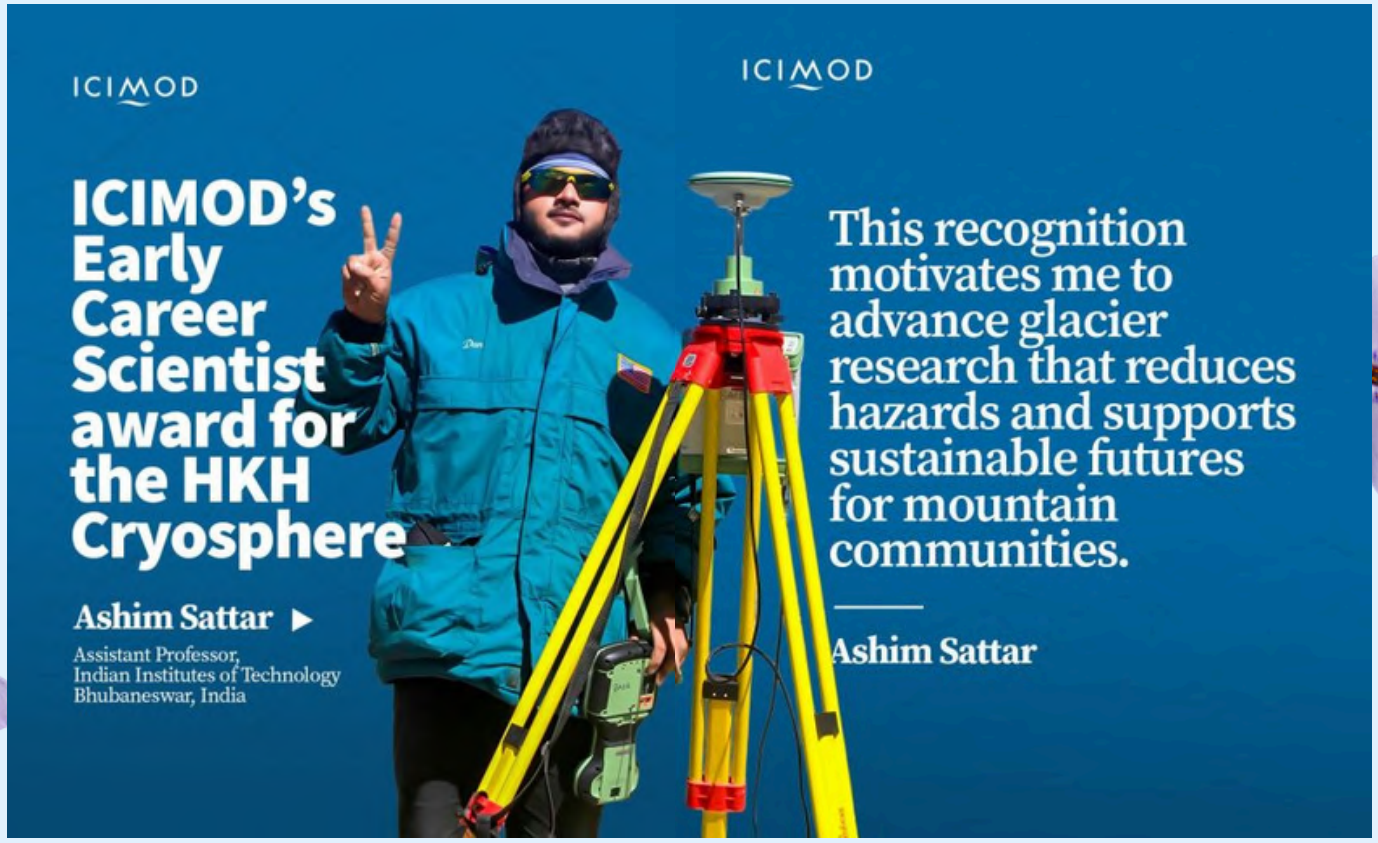
TB Vaccine Candidate Associated with IIT Bhubaneswar Selected under EU-Funded TBVAC-HORIZON Programme

Researchers of IIT Bhubaneswar, led by Prof. Ashis Biswas, School of Basic Sciences (Chemistry), along with the researchers of Institute of Life Sciences, have achieved a significant milestone in tuberculosis vaccine research, as their candidate TB vaccine has been selected under the prestigious TBVAC-HORIZON programme funded by the European Union's HORIZON framework for head-to-head efficacy evaluation. The programme supports promising pre-clinical TB vaccine candidates through globally recognised challenge models.

As part of the programme, the vaccine candidate will undergo evaluation in the mouse M. tuberculosis aerosol infection model at the Medicines and Healthcare products Regulatory Agency (MHRA), UK, against the BCG Danish 1331 reference standard. The studies will assess vaccine-induced protection through reduction in bacterial load following pulmonary challenge with Mycobacterium tuberculosis.

The development marks an important advancement in IIT Bhubaneswar's contribution to global health research and the international TB vaccine development pipeline. The collaborative effort involves partners including TechInvention Lifecare Ltd., Institute of Life Sciences and National Research Development Corporation.

Early Career Scientist (ECS) Award



Dr. Ashim Sattar, Assistant Professor at Indian Institute of Technology Bhubaneswar, has been honoured with the prestigious Early Career Scientist (ECS) Award for his outstanding contributions to cryosphere research in the Hindu Kush Himalaya (HKH) region. Selected from a competitive pool of researchers across the HKH, the award recognises exceptional work in understanding glaciers, snow dynamics, and climate change impacts in vulnerable mountain systems.

Dr. Sattar's research focuses on remote sensing and GIS applications in glacier modelling, Glacial Lake Outburst Floods (GLOFs), and high mountain hazards. His interdisciplinary research spans regions including the Himalayas, the Andes, Iceland, and Central Asia, with a focus on landslides, avalanches, rockfalls, and climate-related risks in mountain geosystems.

Widely recognised for his expertise in cryosphere hazards, Dr. Sattar gained international recognition for his landmark South Lhonak GLOF study published in Science. He also serves as an expert member of the Sikkim Commission on Glacier Hazards and is associated with Glacier and Permafrost Hazards in Mountains (GAPHAZ), contributing significantly to global research on climate and mountain hazards.

Sundays on Cycle

In alignment with the Hon'ble Prime Minister's Fit India Movement (launched 2019) and the subsequent Fit India Cycling Drive under the Khelo India Scheme (launched on 17th December 2024, New Delhi), IIT Bhubaneswar organized a "Sundays on Cycle" rally followed by a Yoga session on 26th April 2026. The primary objective was to promote fitness, cycling, and mental well-being as an integral part of daily life for students, faculty, and staff.

The cycle rally, flagged off by Prof. Rajesh Roshan Dash, Dean of Student Affairs, covered a prescribed route of about 6 km with the participation of around 80 students and staff members. Following the rally, a yoga session was led by a certified yoga instructor.

The event was organized by Dr. Bankim Chandra Mandal, Nodal Officer of FIT India Movement, IIT Bhubaneswar with the help of Assistant Sports Officer Mr. Biswajit Pegu and other sports coaches. The "Sundays on Cycle" event at IIT Bhubaneswar was a success, fostering a culture of health and well-being within the campus. It successfully combined physical exertion (cycling) with mindful recovery (yoga).


“ये कौन चित्रकार है
ये किसने फूल फूल पे
किया श्रृंगार है...”