



# RESEARCH NEWS LETTER

ISSUE: 5

2022



## MAHARAJA SRIRAM CHANDRA BHANJA DEO UNIVERSITY

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### FIRST ANNUAL MAHARAJA SRIRAM CHANDRA BHANJA DEO LECTURE

The First Annual Maharaja Sriram Chandra Bhanja Deo Lecture was organized at convention Hall on 20<sup>th</sup> May, 2022. The first annual lecture was delivered by Professor Jonathan Mark Kenoyer, Department of Anthropology, University of



Wisconsin-Madison, USA. At the outset, Professor Kenoyer paid homage to Maharaja Sriram Chandra Bhanja Deo. In his lecture

titled "The Indus Civilization: New insights into its origin and legacy", Prof. Kenoyer through new lights of research on Indus Valley Civilization. He made a point that people came to live in cities at Harappa not for climate change, but for economic benefit, shared ideology and security from bandits. He also pointed out that the Seals discovered from the sites implied the presence of landowner merchants, ritual specialists. The pottery figurines found in Harappan sites represent shared material culture. On the basis of studies of the teeth of cattle, the diversity of food habits of the human population of Harappa was also reconstructed. Harappa had the diversity of population and diversity in cultural practices integrated through shared ideology and economic benefit. Prof. Kenoyer argued for the presence of matrilocality culture at Harappa. Further he insisted upon learning from the good method of town planning from the Harappans. Hon'ble Vice Chancellor Professor Kishor Kumar Basa presided over the meeting. On this occasion the Chairman, Post Graduate Council, Professor P. K. Satapathy, delivered the welcome address and introduced the guest

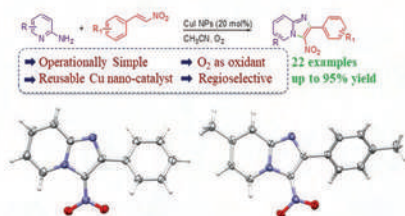
## Research Highlights

**Title :** CuI Nanoparticle-Catalyzed Regioselective Synthesis of 3-Nitro-2-arylimidazo[1,2-a]pyridines using Oxygen as Oxidant

**Investigator :** Dr. Ashis Kumar Jena, Department of Chemistry

**Funded By :** SERB

**Findings :** A mild, efficient and stable copper iodide nanoparticle (CuI NP)-catalyzed regioselective synthesis of 3-nitro-2-arylimidazo[1,2-a]pyridines was developed. Substituted 2-amino pyridines successfully reacted with both electron-rich and electron-deficient  $\beta$ -nitro styrenes to produce the desired products in good to excellent yields. Hot filtration tests confirmed the heterogeneous nature of the CuI NPs. The nanocatalyst showed good reusability up to three consecutive cycles without any significant loss in its activity and product yield, confirmed by high-resolution transmission electron microscopy (HR-TEM) analysis. Use of molecular oxygen as oxidant is advantageous from an economic and environmental point of view (doi.org/10.1002/ajoc.202100776).



CuI NPs catalyzed regioselective synthesis of imidazo [1,2-b] pyridines

**Title :** Effect of doping and thermal annealing on the magnetic characteristics of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>/NiFe<sub>2</sub>O<sub>4</sub> nanocomposites

**Investigator :** Dr. P Mallick, Department of Physics

**Findings :** Dr. Mallick in collaboration with SOA University, Bhubaneswar, UGC-DAE CSR, Kalpakam Node, Institute of Physics, Bhubaneswar, Ravenshaw University, Cuttack and University of Johannesburg, South Africa for different aspect studied the effect of doping and thermal annealing on the magnetic characteristics of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>/NiFe<sub>2</sub>O<sub>4</sub> nanocomposites. Their study indicated the nanocomposite samples could be useful for different device applications. DOI : 10.1007/s10948-021-06115-2

**Title :** LAMP diagnosis for malaria

**Investigator :** Dr G Dhangadamajhi, Department of Biotechnology

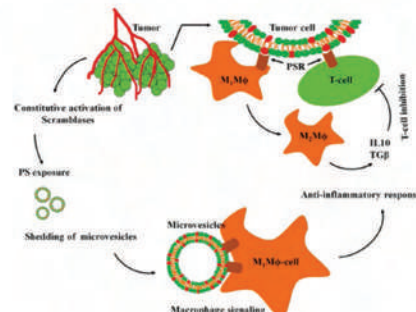
**Findings :** Dr. Gunanidhi Dhangadamajhi and his team of Department of Biotechnology, MSCBD University in association with researchers from Jawaharlal Nehru University, New Delhi have developed a LAMP based rapid diagnosis tool for point of care diagnosis of malaria and quantitative estimation of parasite load in the blood samples (doi: 10.3389/fcimb.2022.961832).

**Title :** Phospholipid Scramblases: Role in Cancer Progression and Anticancer Therapeutics

**Investigator :** Dr S.K. Sahu, Department of Biotechnology

**Funded by :** DST, Govt. of Odisha, Odisha

**Findings :** Tumor cells exhibit altered membrane features, high constitutive PS exposure, low drug permeability and increased multidrug resistance through clonal evolution. PLSCRs are transcriptionally up-regulated in tumor cells leading to plasma membrane remodeling and aberrant PS exposure on cell surface. In addition, PLSCRs interact with multiple cellular components to modulate cancer progression and survival. While PLSCRs and PS exposed on tumor cells are novel drug targets, many exogenous molecules that catalyze lipid scrambling on tumor plasma membrane are potent anticancer therapeutic molecules. In this review, we provide a comprehensive analysis of scramblase mediated signaling events, membrane alteration specific to tumor development and possible therapeutic implications of scramblases and PS exposure



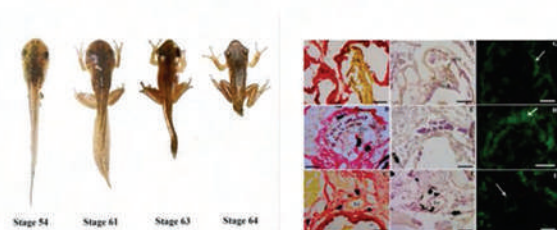
Immunosignaling in the tumor microenvironment

**Title :** Protein S-nitrosylation: Nitric oxide signaling during anuran tail regression

**Investigator:** Dr Cuckoo Mahapatra, Department of Zoology

**Funded By :** UGC-BSR Start-up Grant and DST-SERB, Govt of India

**Findings :** The study describes the contribution of nitric oxide and reactive nitrogen species (nitrosative stress) during tail regression in the tadpoles of Indian tree frog, *Polypedates maculatus*. This is the first description of the mechanism in an Indian frog (<https://doi.org/10.1016/j.acthis.2022.151899>).



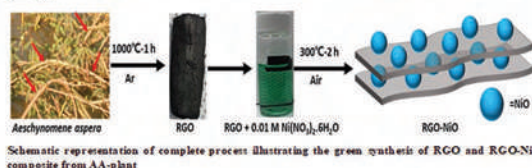
Variation of magnetization with magnetic field for NiO and Ni- $x$ ZnO/Ni ( $x = 0$  to 0.1) nanocomposite taken in first interval (i.e., 0 to H) measured at 300 K. The solid line corresponds to the fitted data to the experimental data.

**Title :** Green synthesis of graphene derivative from natural carbon sources.

**Investigator:** Dr Yashabanta Narayan Singhababu, Department of Material Science

**Funded By :** OURIP, OSHEC

**Findings :** This study demonstrates the use of sustainable, waste natural carbon source, "*Aeschynomene aspera*" (AA) plant towards green and scalable synthesis of carbon 2-D materials and its composite with NiO for high performance anodes in LIBs. Unlike conventional, hazardous and multi-step methods, the present study shed light on the fact that by simply tuning the heating temperature in inert atmosphere both graphene oxide (GO) and reduced graphene oxide (RGO) can be synthesized from the AA plant. Electrochemical property evaluation of these carbon 2-D materials and its composite with NiO as an anode for LIBs are performed to ascertain its Li-ion storage capacity (Published in Chemistry select, [doi.org/10.1002/slct.20220](https://doi.org/10.1002/slct.20220))



**Title :** Tree species composition and carbon stocks assessment in different forest types of Similipal Biosphere Reserve, Odisha

**Investigator:** Dr S. C. Sahu, Department of Botany

**Funded By :** DST, Govt. of Odisha, Odisha

**Findings :** The estimated total forest carbon stock in three forest types of Similipal Biosphere Reserve (SBR) is 0.08 billion tonnes which is equivalent to 0.33 billion tonnes of CO<sub>2</sub> equivalence. It indicates the potentiality of SBR for storing carbon, which facilitates to implement the carbon credit programmes (REDD+) for climate change mitigation and sustainable development. The highly economic tree species such as *Madhucalongifolia* var. *latifolia*, *Buchananianlzanan*, *Diospyros melanoxylon*, *Phyllanthus emblica* etc. can be used in the plantation programme to meet the objectives of carbon stock enhancement and biodiversity conservation. High protection is needed to the peripheral areas and dry deciduous forests of SBR, where anthropogenic influence is high. Further, these areas bear higher possibility for total carbon stock enhancement of SBR, if managed properly (DOI:10.1016/j.eco-leng.2022.106660).

**Title :** Scattering of Low Energy Electrons off Carbon Monoxide Molecules

**Investigator:** Dr. A. Dora, Assistant Professor, Dept. of Chemistry

**Funded by:** DST Govt. of India, India

**Findings :** As part of fundamental quantum theoretical studies of low energy electron collisions with diatomic molecules, we have been studying various aspects of CO molecule. In our recently published works we have established the presence of several higher lying resonant states of CO<sup>-</sup> that have longer lifetimes which may contribute towards the dissociative attachment process. For such resonances we have computed the potential energy curves and their associated widths. Moreover, we have also studied electronic excitations of CO molecule and computed differential cross sections which we found to agree well with experimentally measured values.)

## Research Highlights

**Title :** Investigation of magnetocaloric effect in various oxides

**Investigator :** Dr. Jyoti Ranjan Sahu, Dept. of Physics

**Funded By :** DST, Government of Odisha

**Findings :** Magnetization measurements in  $(\text{La}_{1-x}\text{Bi}_x)_0.67\text{Ba}_{0.33}\text{MnO}_3$  (for  $x = 0 - 0.3$ ) reveal the onset of a ferromagnetic ordering (TC) in the range 336 K- 229 K which shifts towards low temperatures with increasing  $x$ . Magnetocaloric effect (MCE) measurements yield the maximum value of entropy change  $[(-\Delta S)_{M^{\max}}]$  around TC that decreases from  $\sim 6.19 \text{ J/Kg/K}$  for  $x = 0$  to  $\sim 4.79 \text{ J/Kg/K}$  for  $x = 0.3$  for a field change of 9 T. Remarkable enhancement in the relative cooling power (RCP) is observed with the value increasing from  $\sim 400.45 \text{ J/Kg}$  for  $x = 0$  to  $\sim 472.81 \text{ J/Kg}$  for  $x = 0.3$ . The substantial increase in the magnetocaloric properties of  $(\text{La}_{1-x}\text{Bi}_x)_0.67\text{Ba}_{0.33}\text{MnO}_3$  compounds compared to other compounds reported in the literature makes them potential candidates to be used for magnetic refrigeration purposes. Similarly, Mn-substitution in  $\text{LaSr}_0.5\text{Sr}_{0.5}\text{CoO}_3$  also shows exciting MCE properties. <https://doi.org/10.1016/j.mat>

**Title :** Integrated Micro watershed Management plan in Similipal Tiger Reserve Using Remote Sensing & GIS

**Investigator :** Dr H. K. Sahu, Department of Zoology

**Funded by :** Similipal Tiger Reserve, Forest Dept. Govt. of Odisha

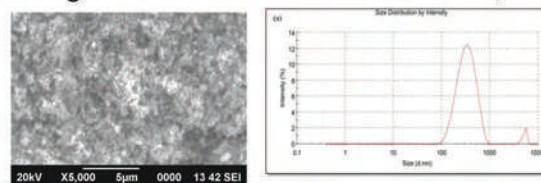
**Findings :** The waterbodies like river and streams were recorded in the STR region. Collection of source data like satellite data of two seasons, SOI toposheets and village maps were carried out. Secondary data like ground water levels, agriculture, population and socioeconomic data were collected. Various thematic maps like base map, contour map, drainage map, soil map, geomorphology map, slope map and land use/land cover map were prepared by using SOI toposheets and satellite imageries. After analyzing all maps, action plan map was generated for the soil and water conservation in the study area.

**Title :** Green synthesis, characterization and evaluation of immunostimulatory and antimicrobial potential of metal based nanoparticles for fish health management

**Investigator :** Dr. S.K. Nayak

**Funded by :** DST, Govt. of Odisha

**Findings :** Different metal and metal oxide based nanoparticles such as Se, ZnO, CuO,  $\text{Fe}_2\text{O}_3$ ,  $\text{TiO}_2$ , MgO,  $\text{Al}_2\text{O}_3$  from various plant/plant parts and their antimicrobial activity against various pathogens were studied. Amongst, ZnO nanoparticles synthesized from Cymbopogon citrates and CuO synthesized from Citrus limon have good antibacterial activity against various aquatic pathogens. In vivo assessment revealed that the synthesized CuO and ZnO nanoparticles showed good immunostimulatory property in fish. Similarly, extract of the plant Blumea axillaris was found to synthesise nanoparticles as evident from DLS and SEM studies (Shown in Figure). The stem and root synthesized selenium nanoparticles were found to be effective against several drug resistant pathogens of aquatic origin (<https://doi.org/10.1080/2314808X.2021.2019949>).



**Title :** Climate change and household vulnerability to food insecurity in Odisha: a panel data analysis

**Investigator :** Dr. Pratap Kumar Jena, Assistant Professor, Department of Economics

**Funded by :** Higher Education Department, Government of Odisha

**Findings :** This project is sanctioned by the Higher Education Department, Government of Odisha to study on (i) the trends of rainfall, temperature and agriculture production in districts of Odisha, (ii) to examine the effects of rainfall and temperatures on agricultural productivity in districts of Odisha, and (iii) to examine the impact of climate change on food insecurity in districts of Odisha. The study has used panel data and Capaldo et al., (2010) and Karfakis et al., (2011) proposed methods to -

examine the effects of climate change. It is found that the climatic variables such as rainfall and temperature have affected agricultural crops production in the state.

**Title :** Cognitive Models of Natural Language Comprehension

**Investigator:** Dr. Hima Bindu Maringanti, Professor, Dept. of Computer Application

**Findings :** Research Scholars under her guidance worked on Wireless Sensor Networks, SPAM filtering Genetic Algorithm, Smart Agriculture, Natural Language Processing, Image Processing, Cognitive Computational Science, Aspect Oriented Programs, Network Security, Opinion Mining in Odia Language, EEG analysis and Inference about Human Consciousness, Cognitive System of Emotional Intelligence with Socio-Security Quotient etc. Most of the works above are patentable and a couple of applications for design and copyrights have been filed. An Odia Opinion WordNet/Corpus has been developed. Few algorithms are also of much value for future researchers.

A) Design patent for the Cognitive Model of Language comprehension has been filed- co-applicant : Dr. Meenakhi Sahu

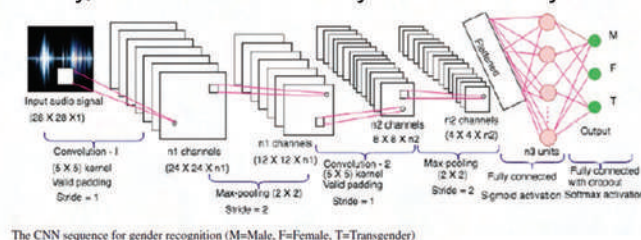
B) Opinion WordNet/Corpus has been applied under copyrights-Co-applicant: Ms. Gayatri Dey

C) Algorithms – SOLMAT and SOMM would be filed under Innovative Design category- Co-applicant: Ms. Gayatri Dey

**Title :** Development of a rough set theory and deep learning-based predictive system for gender recognition using audio speech

**Investigator:** Dr. Janmenjoy Nayak, Assistant Professor, Dept. of Computer Science

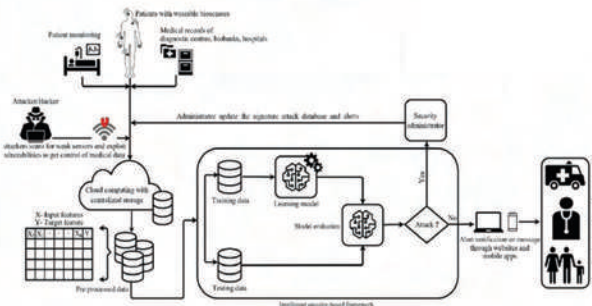
**Findings :** Speech is one of the most delicate medium through which gender of the speakers can easily be identified. Though the related research has shown very good progress in machine learning, Dr Nayak in the association with Indian Institute of Engineering Science and Technology, Shibpur, Howrah 711103, India has developed a rough set theory and deep learning-based predictive system for gender recognition using audio speech. A possible set of acoustic features are extracted from audio speech and a novel feature selection algorithm is devised using the concepts of information theory and rough set theory to select only the informative, precise, and unambiguous features relevant for gender recognition. Generally, voice of transgender is different to distinguish from male or female voice accurately, and this uncertainty is tackled by our developed model (DOI: 10.1007/s00500-022-07074-z)



**Title :** An optimization driven intelligent framework for IoMT cyber-attack detection

**Investigator:** Dr Janmenjoy Nayak, Assistant Professor, Dept. of Computer Science

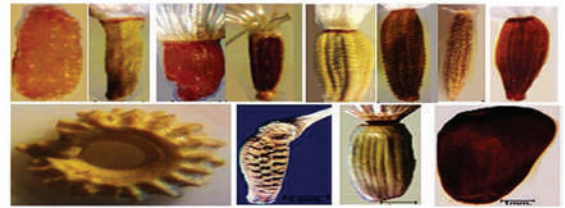
**Findings :** Dr Nayak in the association with Halic University, Turkey & ISI, Bangalore has developed an optimization driven intelligent framework for IoMT cyber-attack detection which minimizes the vulnerabilities in IoMT devices and unauthorized access for potential entry into healthcare and sensitive personal data. To provide security to IoMT devices and privacy to patient data, we have proposed a novel IoMT framework with the hybridization of Bayesian optimization and extreme learning machine (ELM). The proposed model derives encouraging performance with enhanced accuracy in decision-making process compared to similar state-of-the-art methods (DOI:10.1007/s11227-022-04453-z)



**Title :** A novel Convolution Neural Network (CNN) model architecture has been proposed for fruit identification

**Investigator :** Dr Sujata Dash, Department of Computer Application

**Findings :** A novel Convolution Neural Network (CNN) model architecture has been proposed for fruit identification and its family classification based on images for the sake of automation. The model had higher accuracy and efficiency which successfully predicted 93% of images.

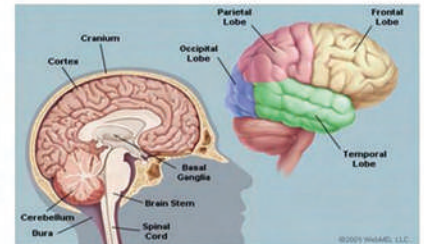


The fruit image of family Asteraceae used for the dataset

**Title :** A Review on Machine Learning Approaches in Identification of Pediatric Epilepsy

**Investigator :** Dr. Sujata Dash, Department of Computer Application.

**Findings :** Seizures are the most common symptom of epilepsy. As a regular medical procedure, the specialists record brain activity using an electroencephalogram (EEG) to observe epileptic seizures. The detection of these seizures is performed by specialists, but the results might not be accurate and depend on the specialist's experience; therefore, automated detection of epileptic paediatric seizures might be an optimal solution. In this regard, several techniques have been investigated in the literature. This research aims to review the approaches to paediatric epilepsy seizures' identification especially those based on machine learning, in addition to the techniques applied on the CHB-MIT scalp EEG database of epileptic paediatric signals.



## Corona Pandemic Corner

The coronavirus outbreak not only has a growing impact on the global economy but also on our social behaviour. The existing health infrastructure in India is very inadequate for COVID patients. Therefore a study was carried out to investigate the linkage and impact of paramedical staffs and health infrastructure on the number of corona virus deaths focusing on inter-state variation and to analyse the economic effect of COVID-19 pandemic on GDP, unemployment, inflation and industrial production. This study is completely based on secondary data and analysis is based on multi-variate regression model, ANOVA, correlation matrices, graphs and descriptive statistics. Corona positive to bed ratio, positive to doctor ratio, positive to nurse ratio and positive to hospital ratio variables are significant in determining corona deaths in India. The Corona death to corona positive ratio does not determine the number of deaths in a good way. There is wide variation in health infrastructure across states in India. Therefore strict practice of COVID appropriate behaviour is the basic necessity to control the spread of the pandemic (K.K. Sahu, S. Patra, S. Tarai, A. Bhukta and A. Tripathy. Corona virus, health infrastructure and economic growth in India, Vidyabharati International Interdisciplinary Research Journal 13(1) ; 52-65)



Similarly, the analysis of the impact of coronavirus in major countries of the world with special reference to India was also studied. There is direct disruption to global supply chains due to the outbreak of coronavirus. Lesser demand for goods and services which are imported and decrease of tourists around the globe are adverse effects of this disease. Higher public investment along with other fiscal support needs to be promoted and long term low interest rate is essential to push the global economy (S. Patra1, K. K. Sahu and A. Bhukta. COVID-19: Global Economic Impact of Novel Coronavirus with Special Reference to India, Horizon J. Hum. & Soc. Sci. 2 (S): 173 – 184, 2020) .

COVID-19 vaccine development involves several vaccine platforms but their effectiveness need be assessed in order to determine their protective efficacy. Despite the fact that some affluent countries attempted to vaccinate the majority of their inhabitants, children and pregnant women were first excluded. While the severity of COVID-19 is less severe in children, the COVID-19-related complications are more severe. SARS-CoV-2 infection is also dangerous for pregnant women. The key to limiting COVID-19 infection spread is early discovery, isolation, and the development of safe and efficient vaccinations. As a result, the purpose of this study is to highlight the current development of various COVID-19 vaccine platforms for different groups of people at higher risk of COVID-19, with a special focus on children, pregnant and lactating women, as well as structural and pathogenicity elements of SARS CoV-2



(S. K. Das, M. Paul, B. Chandra Behera & H.N. Thatoi. Current status of COVID-19 vaccination: safety and liability concern for children, pregnant and lactating women. <https://doi.org/10.1080/14760584.2022.2056025>).

In the absence of suitable antiviral drugs and vaccines, the COVID-19 pandemic has created an urgent need for accurate diagnostic tools that would be helpful for early detection of the patients. Many tests including classical and high-throughput techniques have developed and obtained U.S. Food and drug administration (FDA) approval. However, efforts are being made to develop new diagnostic tools for detection of the disease. Several molecular diagnostic tests such as real-time-polymerase chain reaction, real-time isothermal loop-mediated amplification (RT-LAMP), full genome analysis by next-generation sequencing, clustered regularly interspaced short palindromic repeats technique and microarray-based assays along with other techniques such as computed tomography scan, biomarkers, biosensor, nanotechnology, serological test, enzyme-linked immunosorbent assay (ELISA), isolation of viral strain in cell culture are currently available for diagnosis of COVID-19 infection. This study provides a brief overview of promising high-throughput techniques currently used for detection of SARS-CoV-2, along with their scope and limitations that may be used for effective control of the disease

B. C Behera , R. R Mishra , H. N. Thatoi . Recent biotechnological tools for diagnosis of corona virus disease: A review. *Biotechnol Prog.* 2021 Jan;37(1):e3078. DOI: 10.1002/btpr.3078

The fact that host genetic make-up is crucial in determining inter-individual variation in morbidity and mortality due to infectious diseases including COVID-19. Amongst the several host genetic factors, TLR3 activation by double-stranded RNA intermediate formed during viral replication is demonstrated to be beneficial against a wide range of RNA virus infections. Interestingly, the high binding affinity of SARS Cov-2 non-structural protein 10 (NSP10) mRNA to TLR3 in docking study suggests a possible induction of TLR3 downstream signalling during COVID-19. Inspired with these findings, Dr Dhangadamajhi and his team conducted a genetic association study to examine whether functional genetic variation in the TLR3 gene has a role in the global incidence of COVID-19 across diverse populations. Their findings showed significant susceptibility to COVID-19 infections and associated mortality in population having high frequency of TLR3 non-synonymous mutation in exon 4 (rs3775291), which is established to impair TLR3 expression and subsequent signalling cascade (G. Dhangadamajhi and R. Rout. Association of TLR3 functional variant (rs3775291) with COVID-19 susceptibility and death: a population-scale study. *Human Cell.* 2021; 34(3): 1025–1027. doi: 10.1007/s13577-021-00510-6).



## RESEARCH NEWS LETTER

Dr Janmenjoy Nayak, Department of Computer Science in association with SASTRA Deemed to be University, Thanjavur, India, & Amity University, Uttar Pradesh, Noida, India have developed an efficient technique to find the influential nodes using centrality measure of weighted directed hypergraph. Genetic Algorithm is exploited for tuning the weights of the node in the weighted directed hypergraph through which the characterization of the strength of the nodes, such as strong and weak ties by statistical measurements (mean, standard deviation, and quartiles) is identified effectively. The technique has been applied to COVID-19 viral protein interactions. The proposed algorithm identified some critical human proteins that belong to the enzymes TMPRSS2, ACE2, and AT-II, which have a considerable role in hosting COVID-19 viral proteins and causes for various types of diseases. These proteins can be targeted in drug design for an effective therapeutic against COVID-19 Central hubs prediction for bio networks by directed hypergraph-GA with validation to COVID-19 PPI.



(Gopalakrishnan, S., Sridharan, S., Nayak, S. R., Nayak, Janmenjoy ., & Venkataraman, S. (2022). Central hubs prediction for bio networks by directed hypergraph-GA with validation to COVID-19 PPI. *Pattern Recognition Letters*, 153, 246-253.)

Ever since the pandemic of Coronavirus disease emerged in Wuhan, China, it has been recognized as a global threat and several studies have been carried out nationally and globally to predict the outbreak with varying levels of dependability and accuracy. Also, the mobility restrictions have had a widespread impact on people's behavior such as fear of using public transportation (traveling with unknown passengers in the closed area). Securing an appropriate level of safety during the pandemic situation is a highly problematic issue that resulted from the transportation sector which has been hit hard by COVID-19. This paper focuses on developing an intelligent computing model for forecasting the outbreak of COVID-19. The autoregressive integrated moving average (ARIMA) machine learning model is used to develop the best model for twenty-one worst-affected states of India and six worst-hit countries of the world including India. The best ARIMA models are used for predicting the daily-confirmed cases for 90 days future values of six worst-hit countries of the world and six high incidence states of India. The goodness-of-fit measures for the model achieved 85% MAPE for all the countries and all states of India. The above computational analysis will be able to throw some light on the planning and management of health-care systems and infrastructure



(Dash, S., Chakraborty, C., Giri, S. K., Pani, S. K., & Frnda, J. (2021). BIFM: big-data driven intelligent forecasting model for COVID-19. *IEEE Access*, 9, 97505-97517.)

Covid-19 disease caused by novel coronavirus (SARS-CoV-2) is a highly contagious epidemic that originated in Wuhan, Hubei Province of China in late December 2019. World Health Organization (WHO) declared Covid-19 as a pandemic on 12th March 2020. Researchers and policy makers are designing strategies to control the pandemic in order to minimize its impact on human health and economy round the clock. The SARS-CoV-2 virus transmits mostly through respiratory droplets and through contaminated surfaces in human body. Securing an appropriate level of safety during the pandemic situation is a highly problematic issue which resulted from the transportation sector which has been hit hard by COVID-19. This paper focuses on developing an intelligent computing model for forecasting the outbreak of COVID-19. The Facebook Prophet model predicts 90 days future values including the peak date of the confirmed cases of COVID-19 for six worst hit countries of the world including India and six high incidence states of India. The model also identifies five significant changepoints in the growth curve of confirmed cases of India which indicate the impact of the interventions imposed by Government of India on the growth rate of the infection. The goodness-of-fit of the model measures 85% MAPE for all six countries and all six states of India. The above computational analysis may be able to throw some light on planning and management of healthcare system and infrastructure

(S. Dash, C. Chakraborty, S. K. Giri, S. K. Pani. 2021. Intelligent computing on time-series data analysis and prediction of COVID-19 pandemics. *Pattern Recognition Letters*. 151, 69-75)

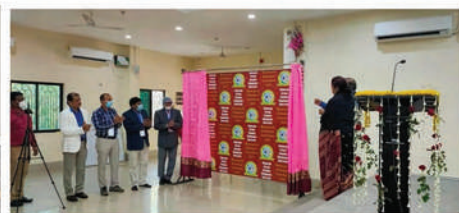
## Events

### E-RESOURCES

e-Resources are available to the University via Odisha State Higher Education Council's Initiative. Under this, EBSCO e-resources and Elsevier Science Direct (10 Subjects) journals are accessible to the students, scholars, and faculty members of the University (<https://eresources.oshec.in>). EBSCO host provides several subscribed databases which provide access to newspapers, magazines, scholarly journals and trade publications. A single-sign-on facility to access these resources are powered by OpenAthens and the access credentials are given to the students, scholars and faculty members (<https://my.openathens.net>)

### RESEARCH SCHOLARS' CONCLAVE

MSCB University organized a two day Research Scholars' Conclave on 14<sup>th</sup> & 15<sup>th</sup> December 2021 not only to provide a forum to identify multi-disciplinary problems but also to inspire and encourage research scholars of various departments of the university to demonstrate innovative research work leading to quality research outputs. Hon'ble Vice Chancellor Prof. K. K. Basa, inaugurated the conclave as Chief guest and addressed the scholars by emphasizing that research is the soul of the University and it should be people-centered for the betterment of society. The conclave was chaired by Prof. A. K. Biswal, Chairman, PG Council. On this occasion, Chief speaker of the conclave, Dr. Sanghamitra Patnaik, Senior Scientist at Krishi Vigyan Kendra, Mayurbhanj, Odisha in her keynote address, discussed various aspects of agricultural research for human welfare. Shri S.Samadhia, Registrar, in his address highlighted the various government incentives for research. Dr. J. K. Mantri, Convener, tendered the welcome address and Dr. P. R. Debata offered vote of thanks.



### DAE-BRNS OUTREACH THEME MEETING ON "SOCIETAL APPLICATIONS OF NUCLEAR SCIENCE AND TECHNOLOGY (SANST-2022)"

A DAE-BRNS Outreach Theme Meeting on "Societal Applications of Nuclear Science and Technology" was jointly organized by the Department of Atomic Energy (DAE), Bhabha Atomic Research Centre (BARC), Institute of Physics (IOP), National Institute of Science Education and Research (NISER) and Maharaja Sriram Chandra Bhanjdeo (MSCB) University, in association with Indian Association of Nuclear Chemists and Allied Scientists (IANCAS) during 25<sup>th</sup> - 27<sup>th</sup> March, 2022 to commemorate Azadi Ka Amrit Mohotsav.

The Outreach Theme Meeting was inaugurated by Dr. Ajit Kumar Mohanty, Director, BARC as Chief Guest and presided by Hon'ble Vice Chancellor, MSCB University Prof. K. K. Basa. Renowned Scientists from different disciplines of BARC, viz., Dr. P.K.Pujari, Director, Radiochemistry & Isotope Group, Dr. A. K. Tyagi, Director, Chemistry Group, Dr. S. M. Yusuf, Director, Physics Group, Dr. T. K. Ghanty, Director, Biosciences Group was present and

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addresses the august gathering highlighting the societal benefit of Nuclear Science in their respective domain. Prof. Asoka Kumar Das, Vice-Chairperson, OSHEC; Dr S.Panda, Director, NISER; Dr K.K.Nanda, Director, IOP addressed on the occasion about the present-day facilities available in the respective institutions.

The basic objective of the programme is to create awareness regarding societal applications of nuclear science and technology amongst the academicians and faculties engaged in Teaching and Research at different Universities, Colleges and Research Institutes of Odisha. The outreach meeting

mainly focused was to create awareness about the technological progress of BARC as well as DAE organizations, utilizing high-end facilities, including research reactors and particle accelerator. In addition to the scientific deliberation on the focused area, other scientific programmes and meetings were also conducted.

The theme meeting focused on the societal applications of radiation technology. On this occasion a demonstration Programme on Radiation Sources: Detection and Measurements was also conducted. Furthermore, an interactive programme on them as production of crops and other agricultural produces with farmers across the district were discussed. They also exhibited their radiated food sample which will be an eco-friendly, sustainable and long-term solution to food security and safety.

**Panel Discussion on Similipal Biosphere Reserve:** Dr Samrat Gowda, Deputy Director, South Similipal, discussed the various problems of management of the biosphere reserve like forest fires. Director, BARC, Dr A. K. Mohanty, emphasized on the long term study on sustainable development of Similipal Biosphere Reserve and suggested the use of hydrogels to control forest fires.

Finally a Scientific as well as R&D Discussions with Faculties of MSCBU were organized between Subject experts, Scientists of BARC, Scientific Secretary of BRNS and faculties of MSCB University. The scientists discussed about the radiation technology and Biotechnology tools for improving plant productivity. In addition, they discussed about the clues and mechanism to mitigate the characterization problem. The Theme Meeting was successfully ended with a valedictory function followed by a Cultural programme.



### MSCBU CONNECT

In order to keep update the teachers and research scholars, recent work done in this University is showcased by the team leader in a monthly or fortnightly organized gathering called Maharaja Sriram Chandra Bhanjadeo University Connect (MSCBU CONNECT). Although COVID-19 lockdown and shutdowns have hampered to the regular organization of the event, we succeeded in organizing MSCBU CONNECT in blended mode wherever possible. On this occasion Dr. Debata shared his unique research findings on various Plant extracts which can be explored for curing various types of cancer.



## ANIMAL SCIENCES RESEARCH FOR SUSTAINABLE DEVELOPMENT



Department of Zoology in collaboration with Zoological Society of Orissa organized a two-day long event entitled "Animal Sciences Research for Sustainable Development" on 29-30th March, 2022. Chief guest Padma Shri Prof. Aditya Prasad Dash, Vice Chancellor, AIPH, Bhubaneswar inaugurated this event and emphasized in his deliberations on the role of rare species, their existence and improvement on elimination of seven major infectious diseases. Prof. S.K.Dutta, President, ZSO has focused on the role and function of Zoological society and its impact on welfare of mankind. Hon'ble Vice Chancellor, MSCB University, Prof. K.K.Basa has expressed his concern on the protection of rare species in Similipal and the impact of climate change on biodiversity. Prof. H.K.Sahu, Dr G.Sahu, Secretary, ZSO, Dr Puspanjali-Parida, Dr Cuckoo Mohapatra, Dr. P.R.Debta and Dr G.Mohanty have coordinated the function. Students and staff were present and actively participated.

## CELEBRATION OF NATIONAL SCIENCE DAY ON 28TH FEBRUARY 2022

On the occasion of the National Science Day on 28th February, 2022, Internal Quality Assurance Cell organized a noted scientist, Prof. Hrudyanath Thatoi, Department of Biotechnology, MSCBU delivered a lecture on the theme, "Biodiversity Conservation and Protection of Coastal Environment of Odisha".

## SIMILIPAL: COMMUNITIES, BIODIVERSITY AND CONSERVATION



The district of Mayurbhanj harboring the university is fringed with similipal biosphere reserve. The 'Similipal Study Centre' of the University funded by IDP-OHEPEE, Government of Odisha organized a two days National Seminar on 'Similipal: Communities, Biodiversity and Conservation' on 20th & 21st December 2021. This event was inaugurated by Hon'ble Vice Chancellor Prof. K.K.Basa. On this occasion he put forth his view on the Conservation and Protection of Similipal by the mutual collaboration of Government, local people, NGOs and Educational Institutions. Chief Guest Dr. Debabrata Swain (Lokayukta) has discussed on the historical perspective, geographical spectrum and present climatic conditions of Similipal. Further, he emphasized on the protection of tigers and other rare animal as well as plant species of Similipal. Invited Speaker Shri M Yogajayanand (Regional Chief Conservator of Forest) has briefed on the responsibility of forest guards and other forest divisional people to restore Similipal. Speaking on the occasion Prof. S.K.Dutta (Retired Professor of Zoology, MSCBU) has highlighted the diversity, peculiarity and significance of herpetofauna found in Similipal.



## Success Stories

### TRANSFER OF TECHNOLOGY & OUTREACH PROGRAMS OF UNIVERSITY

Organic manure is nutrient derived from organic sources like animal waste, vegetable compost, agricultural residues, human excreta, etc. The main idea behind providing organic manure is to break down the complex inorganic nutritional supplements into simpler organic ones that can be easily absorbed and assimilated by the plants. There are numerous fertilizer businesses but beginning an organic fertilizer business is unique in and of itself, as chemical-free goods are in high demand in today's world. Looking into this MSCB University has started one start up activity in the areas of developing liquid organic manure from fish visceral waste since 2020.

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One of such products "Organic Fertilizer from Visceral Waste of Freshwater Fish" developed by Dr Gargee Mohanty, Assistant Professor, P.G. Department of Zoology, MSCB, University, has been transferred to the Agriculture department, Mayurbhanj, Odisha to the farming communities after successful experimental trails. The process of organic fertilizer production and its use in different crops was transferred to the farmers on the World Soil Day through the District Agriculture Office, Govt of Odisha. It was intended to make available to the farmers so that they can also prepare the fertilizer for themselves and for others and make use in their agriculture field and promote organic farming as the product is a totally organic product produced from the visceral waste of fish. Training on organic farming and use of different organic fertilizers like vermicompost, fish fertilizers (produced by us) were disseminated to the farmers and input fertilizer dealers from time to time through different programmes of Department of Agriculture like DAESI (Diploma in Agriculture Extension Service for Input Dealers), and ATMA programs run by Govt of India, and through Zila Mohotsav programs.



### ACHIEVEMENT OF MSCB UNIVERSITY IN THE OPEN BOOT CAMP

DST, Government of Odisha in collaboration with KIIT University along with BCKIC Foundation, an initiative of PSA Office, Govt. of India & KIIT TBI as implementation partnership and in partnership with Carleton University and GNEPO, had organized an "Open Bootcamp" with an aim to spread awareness about entrepreneurship opportunities, discover bright innovative ideas from multiple colleges/universities in Odisha and provide access to Incubation support, mentorship and funding opportunities for the idea to POC building. The focal theme of the OPEN BOOT CAMP is "Promoting Entrepreneurs in the state of Odisha". In this programme, students from Computer Science & Applications, Botany, Zoology, Biotechnology and Economics had participated. Amongst 7 proposed ideas, 4 have been selected for level 1 and finally one of our Pitching Idea entitled 'Automated Intelligent Weed Detection scheme for IoT enabled Smart Precision Agriculture' by Dr. Janmenjoy Nayak (Assistant Professor, Department of Computer Science) along with his student team have been selected for final round (Top 16 ideas after four round screening of all ideas across the state).

### Awards Recieved



Hon'ble Vice Chancellor, MSCB University, Prof. Kishore Kumar Basa, received the Odisha Citizen Awards under Education category by OTV, Odisha. This award was conferred on Prof. Basa in recognition of his outstanding academic excellence.



Hon'ble Vice Chancellor Prof. K. K. Basa handing over the BEST FOUNDATION (GERMANY) PROMOTIONAL AWARD/PRIZE money amounting Rs 1,95,180/- to Ms Dibya Das, Ph. D Scholar, Department of Chemistry, MSCB University

## Seminar/Conferences/Workshop Organized

| Department    | Level<br>National/International/State | Category        | Title                                                                                                             |
|---------------|---------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|
| Biotechnology | National                              | Seminar         | Similipal: communities, biodiversity and conservation                                                             |
| Chemistry     | National                              | Conference      | 35th Annual Conference of Orissa Chemical Society And National Seminar on Chemical Sciences (FCS-2021)            |
| Hindi         | National                              | Seminar         | Necessity of Translation                                                                                          |
| IQAC          | National                              | Seminar         | Research scholar conclave                                                                                         |
| Biotechnology | National                              | Online Workshop | Phylogeny, homology modeling & molecular docking                                                                  |
| Odia          | National                              | Seminar         | Eminent Oramotist Ananda Sankar Das                                                                               |
| Zoology       | International                         | Seminar         | Role of Small Molecules In The Treatment of Inflammatory Diseases                                                 |
| IQAC          | National                              | Workshop        | Training on Data Compilation Software                                                                             |
| Economics     | National                              | Workshop        | Value-Added Course on Youth Empowerment                                                                           |
| Economics     | International                         | Seminar         | Memory and intransient growth                                                                                     |
| IQAC          | University                            | Workshop        | Role of IPR In University R&D And Innovation Management                                                           |
| English       | National                              | Webinar         | Reading with The Dutts: Toru Dutt And The Practice of Leisurely Reading                                           |
| IQAC          | National                              | FDP             | Online FDP on Heartful Campus                                                                                     |
| IQAC          | National                              | Workshop        | Leadership conclave                                                                                               |
| English,      | International                         | Webinar         | Mapping modernism                                                                                                 |
| Botany        | National                              | Seminar         | World environment day                                                                                             |
| Botany        | National                              | Seminar         | Celebration of International Biological Diversity Day                                                             |
| University    | National                              | Seminar         | Online Video Conferencing with BARC Exploring Opportunities of Collaborative Research With DAE-BRNS, BARC, Mumbai |
| English       | National                              | Seminar         | Online Book Release And Discussion of <i>Mashani Sahar Delhi</i>                                                  |
| Botany        | National                              | Conference      | Phytoresources and its management strategies                                                                      |
| Biotechnology | International                         | Webinar         | Biotechnological Innovations In 21st Century                                                                      |

| Department               | Level<br>National/International/State | Category         | Title                                                                             |
|--------------------------|---------------------------------------|------------------|-----------------------------------------------------------------------------------|
| English,                 | National                              | Online Lecture   | A Tale of Two Trees, Or How India Took To The Book                                |
| Odia                     | State                                 | Seminar          | Observation of 8th Sastriya bhasadibasa                                           |
| University               | State                                 | Seminar          | CBCS courses                                                                      |
| Zoology                  | State                                 | Seminar          | Online Teachers' Training Programme on Advances In Molecular Biology              |
| University               | State                                 | Seminar          | Principal's conference                                                            |
| IQAC                     | University                            | Webinar          | National science day                                                              |
| Odia                     | State                                 | Seminar          | Observation of 3rd Foundation Day of University Literary Council                  |
| English, Keonjhar Campus | University                            | Special Lecture  | Postcolonial literature                                                           |
| University               | State                                 | Workshop         | Understanding the NAAC accreditation process and securing good grades (paramarsh) |
| University               | University                            | Training Program | Short Term Academic Virtual Training Program on Office Governance                 |

## Research Grants Received

**PI:** Dr. Santosh Kumar Sahu, Biotechnology  
**Title:** Synthesis of Novel Therapeutic Phyto-conjugates against Multi-drug Resistant *S. aureus* from flippase inducing Phytochemicals of *Gymnema Sylvestre* and natural anti-*S. aureus* prodrugs

**Funding Agency:** DST-Odisha

**Amount:** 4.44 lakhs

**PI:** Dr. Biswajit Rath, Biotechnology  
**Title:** Study on Diversity of Lichens in Similipal Biosphere Reserve and Evaluation of their antimicrobial and antioxidant activity for pharmaceutical application

**Funding Agency:** DST-Odisha

**Amount:** 5.39 lakhs

**PI:** Dr. Pratap kumar Jena, Economics  
**Title:** Commercialisation of non-timber forest product: Determinants and supply chain in India  
**Funding Agency:** National Human Rights Commission, Govt. of India

**Amount:** 4.28 lakhs

## Patents/MoU/Publications/Ph. D

Ph.D : 41

### Publications

● Research articles (UGC care enlisted) : 89

● Book/Book Chapters : 68

● Patent : 3

MoU : 2

Awards (Research) : 26

**PI:** Dr Debasis Naik, WLBC

**Title:** Assessment of Nutritional and Microbial quality of Traditional rice beverage 'Handia' from Mayurbhanj district of Odisha

**Funding Agency:** OURIP

**Amount:** 4.90 lakhs

**PI:** Dr. Yashabanata Narayan Singhababu, Material Science

**Title:** Natural and sustainable natural carbon source derived reduced graphene oxide-polymer composite as a smart and environment-friendly anticorrosive coating material for metals and alloys in sea water environment

**Funding Agency:** OURIP seed fund

**Amount:** 2.72 lakhs