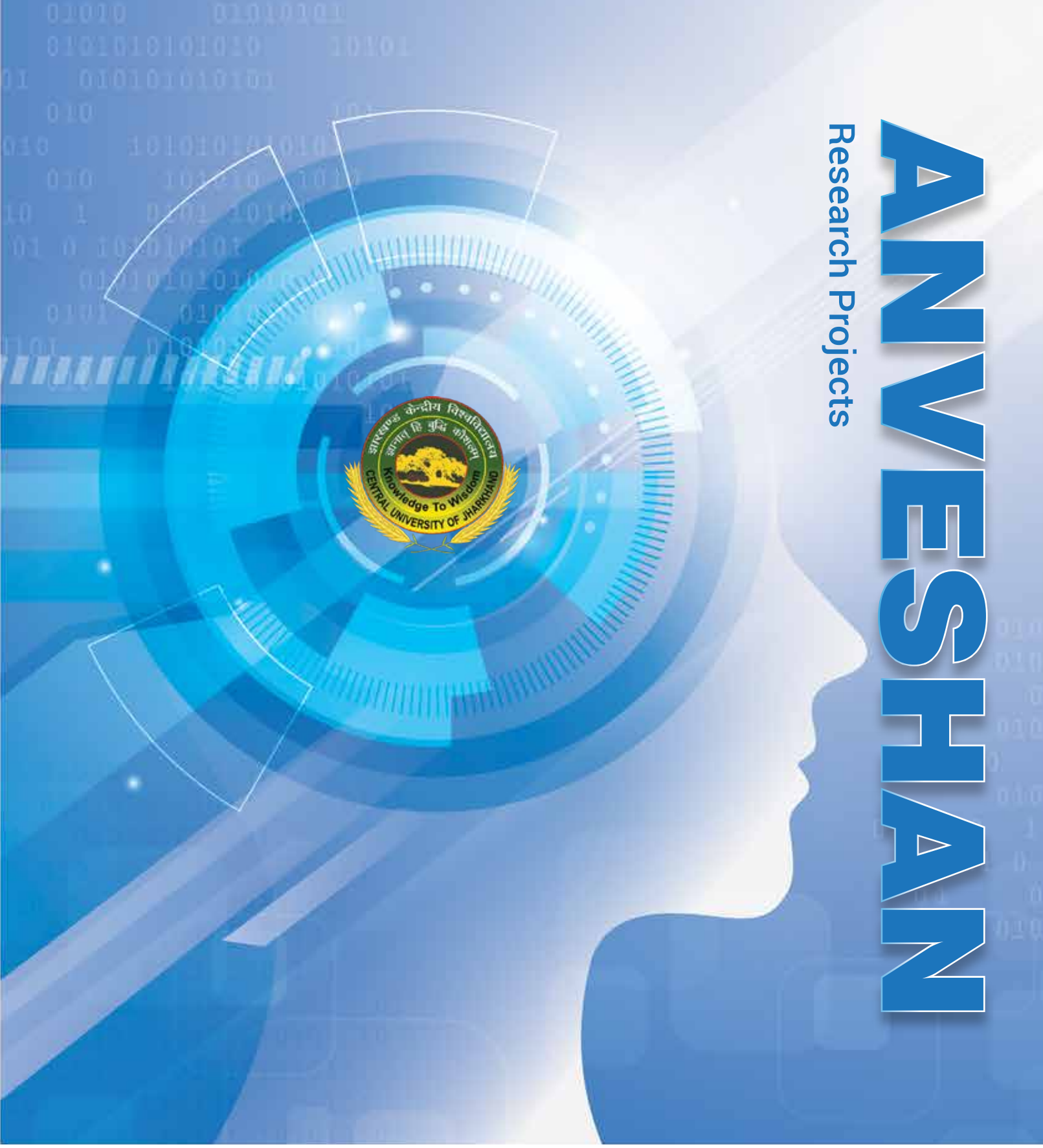
ANVESHAN

Research Projects



CENTRAL UNIVERSITY OF JHARKHAND, RANCHI

(Established By An Act of Parliament of India, 2009)

ज्ञानात् हि बुद्धि कौशलम्

Knowledge to Wisdom

झारखण्ड केन्द्रीय विश्वविद्यालय
ज्ञानात् हि बुद्धि कौशलम्
Knowledge To Wisdom
CENTRAL UNIVERSITY OF JHARKHAND

Central University of Jharkhand, RANCHI

(Established By An Act of Parliament of India, 2009)

मुख्य संरक्षक / Chief Patron

प्रो. नन्द कुमार यादव 'इन्दु'
कुलपति
Prof. Nand Kumar Yadav 'Indu'
Vice-Chancellor

संरक्षक / Patron

प्रो. एस. एल. हरि कुमार
कुलसचिव
Prof. S. L. Harikumar
Registrar

संपादक / Editors

Dr. D.B. Lata
Associate Professor
Department of Energy Engineering
Chairman, Training and Placement Cell
In-charge, Research and Development

Dr. G. P. Singh
Associate Professor & Head
Department of Nano Science & Technology

Mr. Rajesh Kumar
Assistant Professor
Department of Mass Communication
NCC Officer, CUJ

INTRODUCTION

The Central University of Jharkhand came into being under the Central Universities Act, 2009 promulgated by the President of India on 1st of March 2009. The above Act envisages establishing and incorporating Universities for teaching and research in the various states. The Central University of Jharkhand started with a vision to specially focus on relevant present age educational drives with an emphasis on research in cutting-edge technologies.

VISION

The vision of the University is to create a world class university in every aspect, be it research, teaching, administration or co-curricular activities, to produce world class students ready to excel in every chosen field with honour and uprightness.

THE MOTTO - Knowledge to Wisdom

Students join higher education courses to gain knowledge. At CUJ, we strive hard to turn that knowledge to wisdom in order that society finally gains a useful citizen to guide and mould its destiny.

This we plan to do through many compulsory community-based projects, interactions with a wide cross-section of people from within our country and outside it and innovations in the teaching-learning processes.

OBJECTIVES

The objectives of the University are to:

- Disseminate and advance knowledge by providing instructional and research facilities in various disciplines
- Promote innovations in teaching-learning process and inter-disciplinary studies and research
- Educate and train manpower for the development of the country
- Establish linkages with industries for the promotion of science and technology and
- Pay special attention to the improvement of the social and economic conditions and welfare of the people, their intellectual, academic and cultural development.

CONTENTS

School of Natural Sciences

DEPARTMENT OF LIFE SCIENCES

Dr. Amarendra Narayan Misra

Designation : Professor
Mobile : 9437295915, 7544049850
E-mail : misraan@yahoo.co.uk; anm@cuj.ac.in

Research Projects

1. **DBT BUILDER**
   Funding Agency : Department of Biotechnology
   Amount : Rs. Four Crores forty-three lakhs eleven thousand five hundred only
   Duration : Oct. 2014-Nov. 2019

Outcome/Objective

- To promote Interdisciplinary scientific research, innovative teaching and advanced training in the areas of Molecular biology, Cancer Biology / Medical Biotechnology Epigenetics, Microbiology and Developmental Biology)

Dr. Manoj Kumar

Designation : Associate Professor
Mobile : 9801233616 / 8585916308
E-mail : manoj@cuj.ac.in

Research Projects

1. **Support to establish DBT-Boost to Central University Of Jharkhand Interdisciplinary Life Science Departments for Education and Research (BUILDER) Programme.**
   Funding Agency: DBT, Ministry of Sciences and Technology
   Amount : 44311500 /-(Four Crore Forty Three Lakhs Eleven Thousand Five Hundred Only)
   Duration : 2015-2020

Outcome/Objective

- In-house Manpower Training
- Infrastructural Development and Facility establishment
- Supported and boosted students career i.e. UGC-CSIR-JRF /NET; GATE qualified (DLS, CUJ)
- Manpower trained from other Universities / Institutes
- Supported Seminars and Workshop organized by Dept. of Life Science
- Major publications extracted from DBT-BUILDER support

2. **Combined effect of Arbuscular mycorrhizal fungi (AMF) on *Oryza sativa* for the stress management**
   Funding Agency : FOSTECT Grant (Code: FOSTECT.BR. 20, Vietnam Govt.
   Amount : Nineteen Hundred Million VND
   Duration : 2015-2017

Outcome/Objective

Technical exchange program under Indo-Vietnam joint research venture. Ameliorated stress tolerance in economically important crop rise for both the countries. Developed microbial strains for the soil enhancement to remediate the rice plates in both the countries.

3. **Study of micro-fauna in the rhizosphere of *Hippophae rhamnoides* L. growing at different altitudes of Himalayan region**
   Funding Agency : DRDO
   Amount : 9.8 lakhs
   Duration : 2012-2015

Outcome/Objective

- Studied root architecture of *Hippophae rhamnoides* L. for its susctibale growth and development in trans-Himalaya region (Leh), and developed micro-consortium of *Frankia* and other associated spp. isolated from root nodules and rhizospheric regions.

Dr. Ashish Sachan

Designation : Associate Professor
Mobile : 8521888927, 898689647
E-mail : ashish.sachan@cuj.ac.in

Research Projects

1. **Process Optimization for Bioemulsifier Production By Microorganisms (UGC Project F. No. 40-160/2011 (SR))**
   Funding Agency : University Grants Commission, Govt. of India
   Amount : 5.01 Lakhs
   Duration : July, 2011-June2014

Outcome/Objective

- Isolation and screening of bioemulsifier producing microorganisms.
- Optimization of process parameters to enhance the bioemulsifier production.
- Purification of bioemulsifier produced by selected microorganisms.
- Characterization of bioemulsifier produced by selected microorganisms.

2. **Exploiting Agricultural Wastes for Harnessing a value-added product ferulic acid (DST SERB No. SR/FT/LS-46/2012)**
   Funding Agency : Science and Engineering Research Board, Govt. of India
   Amount : 19.40 Lakh
   Duration : March, 2013-March, 2016

Outcome/Objective

- Screening and selection of microorganisms capable of releasing ferulic acid from agro-residues
- To standardize the process parameters to enhance the release of ferulic acid from agro-residues.
- To optimize the downstream processes for purifying ferulic acid from culture broth.
- Characterization of esterase enzyme(s) from selected microorganisms

3. **Bioprocess Development for efficient Triclosan Degradation (CSIR NO. 24(030)/16/EMR II)**
   Funding Agency : Council of Scientific &Industrial Research, Govt. of India
   Amount : 14.80 Lakh
   Duration : July 2016-June 2019

Outcome/Objective

- Isolation, Screening and characterization of Triclosan degrading microorganisms.
- Process development to enhance Triclosan degradation by micro-organisms.
- Elucidation of Biodegradation Pathway of Triclosan.
- Immobilization of Triclosan degrading microorganism(s) for in-situ applications.

Dr. Praveen Kumar Sharma

Designation : Assistant Professor
Mobile : 8229813927
E-mail : pksharma@cuj.ac.in

Research Projects

1. **DBT-Central University of Jharkhand (CUJ) Interdisciplinary Life Science Programme for Advance Research and Education**
   Group Leader : Dr. P.K. Sharma
   Project Title : Molecular Biology of type 2 Diabetes Pathogenesis
   Funding Agency : DBT, GOI

Amount : Rs.443,11500 lacs (Total Project cost)
Duration: 5 years

Outcome/Objective

- Analysis of histone modifications in high sucrose fed flies by the help of Triton X Acid Urea (TAU) gel electrophoresis, western blotting.
- Analysis of Methylation pattern of Hydroxyphenyl pyruvate dehydrogenase, carnetine palmitoyltransferase gene by Bisulfite PCR followed by restriction analysis (COBRA)
- Bioinformatic prediction of transcription factor and cell signaling mechanisms involved in regulation of candidate genes
- Study of regulatory mechanisms of FOXO and activity T_2D Model of *Drosophila* through Chromatin Immuno Precipitation Studies, western blotting, far western blottingTo conduct seminars, workshops, conferences and extension lectures to promote interdisciplinary research in Life Sciences.

Dr. Rajakishore Mishra

Designation : Assistant Professor
Mobile : 9470575594 , 9776407764
E-mail : rajakishore.mishra@cuj.ac.in

Research Projects

1. **Evaluation of therapeutic potential of glycogen synthase kinase 3 in chewing tobacco mediated oral cancer**
Funding Agency : Department of Biotechnology (DBT)
Amount : Rs 38, 89, 881 (for CUJ)
Duration : June 2013 - June 2016

Outcome/Objective

- This aims of this project were to examine the status of GSK3 in Indian oral cancer patients (at DNA, RNA and protein level) and to understand how GSK3 is involved at different oncogenic programs (cell cycle, cell survival, cell death and cell invasion programs) including animal model. All these aims were thoroughly investigated and the findings have been published in a number of reputed journals. The project final report has been accepted by the DBT Taskforce committee. The study provides evidences about the inactivation of GSK3-beta isoform in oral cancer progression and this can be targeted for therapeutic purposes.

Dr. Anil Kumar

Designation : Assistant Professor
Mobile : 9955273226
E-mail : anil.kumar@cuj.ac.in

Research Projects

1. **BUILDER: Soil Microbiology-Study of Plant Growth Promoting Rhizoplanic Soil Bacteria**
Funding Agency : Department of Biotechnology, GoI.
Amount : Rs 4.43 crore
Duration : 5 years from Nov. 2014 to Nov. 2019

Outcome/Objective

- Isolation, characterization and evaluation of soil microbes from Jharkhand to employ them in agriculture.
- 1-Trained students and researchers in the field of microbiology, molecular biology, genetic engineering and its application in benefiting the society. 2- Identification and application of these microbes (bio-fertilizers/plant-bio-stimulants) in improving crop productivity as well as bioremediation of soil contaminants. 3-Research knowledge input to scientific literature throughout the World.

Dr. Pallavi Sharma

Designation : UGC-Assistant Professor
Mobile : 9470416688, 7004507219
E-mail : drpallavi1978@gmail.com; pallavi.sharma@cuj.ac.in

Research Projects

1. **Genome wide transcriptional analysis of heavy metal tolerance gene *Ricinus communis***
   Funding Agency : DST-SERB
   Amount : Rs. 34,70500
   Duration : 3 years (March 2017-March 2020)

Outcome/Objective

- To decipher mechanisms of heavy metal tolerance in bioenergy crop *Ricinus communis*.

2. **UGC-Startup grant**
   Funding Agency : UGC
   Amount : Rs. 600000
   Duration : 2 years (March 2017-March 2019)

Outcome/Objective

- Mechanisms of abiotic stress tolerance in plants.

DEPARTMENT OF PHYSICS

Dr. Sarang Medhekar

Designation : Professor
Mobile : 9431382715,7093655136
E-mail : sarang.medhekar@cuj.ac.in

Research Projects

1. **Modeling and Analysis of all-optical switching devices based on waveguide and photonic crystal geometry**
   Funding Agency : Department of Science and Technology
   Amount : Rs 24,15,120/-
   Duration : 3 Years

Outcome/Objective

- A lot of attention is being paid world over to develop high speed communication, signal processing and computing systems. High speed switching and interconnects are some of the essential ingredients of these systems. In principal, ultra high speed switching is possible with all-optical gates and therefore, a lot of efforts are concentrated to have optical analogs of different electronics gates. As a consequence, numerous proposals are existing for different types of gate function.
- The main objectives of the proposed project were (i) To model/simulate waveguide and photonic crystal based nonlinear waveguide devices and their combinations for photonic integrated circuits (ii) To undertake numerical investigation of the modelled devices (iii) To explore truly practicable all-optical gates.
- The project completed successfully and resulted in 01 Ph D., 08 publications in International Journals.

Dr. Avijit Ghosh

Designation : Assistant Professor
Mobile : 9801070687
E-mail : avijitphy@gmail.com

Research Projects

1. **Investigation of Compositional Engineering for Efficient Perovskite Solar Cells**
   Funding Agency : DST under CERI program
   Amount : Rs. 99,64,200.00
   Duration : 3 years

Objective

- To improve film surface coverage by improving the crystalline quality of grains, which is expected to reduce the overall bulk defect density and mitigate hysteresis by suppressing charge trapping during solar cell operation.
  Hence,
- To achieve the above, Sn modified $MAPbBr_3$ (methylammonium lead bromide) into $FAPbI_3$ or vice versa will be incorporated to stabilize the perovskite phase using hot casting technique on NiO_x in the inverted planar structural approach.
- Thus, it is expected that interface engineered proposed perovskite will provide the long term durable PCEs of above 20% in the large coverage area (> 1 cm^2) in the cost-effective manner.

Dr. Dharmendra Singh

Designation : Assistant Professor
Mobile : 8809323825
E-mail : dsinghcuj@gmail.com,
dharmendra.singh@cuj.ac.in

Research Projects

1. **Role of target deformation on incomplete fusion dynamics in energy range 3-8 MeV/ nucleon**
   Funding Agency : DST, New Delhi
   Amount : Rs. 23.30 Lakh
   Duration : 2011-2014 (3 Years)

Outcome/Objective

- The objective of the proposed work was to investigate the role of target deformation on incomplete fusion dynamics at low projectile energy. The remarkable outcome of this project is "It has been found that more input angular momentum is associated with ICF for deformed target and indicates the involvement of peripheral collisions in deformed target. Hence, the target deformation is found to play an important role in ICF dynamics along with mass-asymmetry". The experimental data of this work has been published in 4 papers in journals of international repute. The data and results obtained from the experiments can be very useful in the development of new generation nuclear reactor technology.

2. **Study of Complete and Incomplete Fusion Dynamics by Using Heavy Ion Beams**
   Funding Agency : UGC, New Delhi
   Amount : Rs. 6.00 Lakh
   Duration : 2013-2015 (2 Years)

Outcome/Objective

- Developed Nuclear Physics research laboratory at Department of Physics, Central University

of Jharkhand, Ranchi. Various experiments were performed at IUAC, New Delhi using heavy ion accelerator facility. The results have been published as 04 papers as regular article in journals of international repute. It has been observed that the onset of incomplete fusion is more for more mass-asymmetric system and it also depends on the energy and structure of projectile at low projectile energy.

3. **Role of Target Deformation on Incomplete Fusion dynamics during heavy Ion Collisions**
Funding Agency : IUAC, New Delhi
Amount : Rs. 6.75 Lakh
Duration : 2013-2017 (3 Years)

Outcome/Objective

- Various experiments have been done at IUAC, New Delhi. One paper published in journal of international reputes. It has been observed that the incomplete fusion dynamics is very much dependent on various entrance channel parameters namely; entrance channel mass-asymmetry, Coulomb factor and target deformation parameter. All these parameters have been found to affect simultaneously along with structure of projectile. The effect of all these parameters has been found to satisfactorily explained by various combined parameters. These results have been reported for the first time. One project fellow worked on this project and will submit PhD thesis soon. The experimental data are useful for the development of theoretical code for incomplete fusion dynamics.

Dr. Sandeep Kumar Chaudhuri

Designation : UGC Assistant Professor
Mobile : 7797745227
E-mail : sandeep.chaudhuri@cuj.ac.in

Research Projects

1. **Realization of physical Frisch Grid using ion implantation in high-Z semiconductor based nuclear detectors**
Funding Agency : UGC-DAE CSR, Collaborative Research Scheme, Kolkata Centre.
Amount : Maximum amount Rs. 8.262 Lakhs
Duration : 3 years

Outcome/Objective

- Compound semiconductor detectors made of elements with high-atomic-number (CdTe, CdZnTe, HgI_2) are most suitable for x- and gamma - ray detection because of their high stopping power. The only problem which impedes their application as nuclear detectors is poor hole transport properties which leads to poor energy resolution in nuclear spectroscopic experiments. In order to overcome this problem, several complicated detector geometries have been proposed and practiced. However, these geometries lead to complexities. The present proposal plans to realize an actual Frisch grid like arrangement embedded in the high-Z semiconductors. The Frisch grid like structure would be achieved by implanting metal ions in the semiconductor single crystal forming a layer of metal ions at a certain depth close to the collecting electrode. (Status : Completed)

Dr Vineet Kumar Agotiya

Designation : Assistant Professor
Mobile : 8920013999
E-mail : agotiya81@gmail.com

Research Projects

1. **Some outlook of strongly interacting quark Gluon Plasma**

Funding Agency: UGC BSR Start up grant
Amount : 6.00 Lakhs
Duration : 2 yrs

Outcome/Objective

- To study various thermodynamic quantities such as temperature, entropy density, pressure, speed of sound, coupling constant by developing an EoS for strongly interacting quark–gluon plasma in the framework of strongly coupled plasma with appropriate modifications to take account of color and flavor degrees of freedom and QCD running coupling constant Motivated by these equation of state (EoS) we also apply EoS to estimate the centrality dependence of J/ψ suppression in an expanding, dissipative strongly interacting QGP produced in relativistic heavy-ion collisions. Based on the investigated results for the above system, we are publishing research papers in journals
  Status : completed

2. **Study of quarkonium in Hot QCD medium using Quasi Particle Approach**
   Funding Agency : SERB
   Amount : Rs.24,56,000/-
   Duration : 3 Yrs

Outcome/Objective

- A potential model for the phenomenological descriptions of heavy quarkonium suppression would be quite useful inspite of the progress of direct lattice QCD based determinations of the potential. We employ the effective fugacity quasiparticle distribution functions to incorporate the hot medium effects, using the effective fugacity quasiparticle model for the isotropic medium as well as anisotropic medium. To examine the hot QCD medium effects using EQPM, the EoS have been updated with the lattice, as well as 3-loop HTL perturbative calculations. The effects of anisotropy will modify the in-medium potential and significantly revise the values of the dissociation temperature in the oblate and prolate case for isotropic medium.

  Status: Ongoing

Dr. Satchi Kumari

Designation : DST Inspire faculty
Mobile : 7042822158
E-mail : satchikumarisingh@gmail.com

Research Projects

1. **All Optical Tunable Delay Line Based on Photorefractive Thin Films for Photonic Applications**
   Funding Agency : DST
   Amount : 35 LAKHS
   Duration : 5 YRS

Outcome/Objective

- Tunability of optical delay is demonstrated experimentally in photorefractive thin films and crystals. Fine tuning of delay has been demonstrated in Ruby crystal. Theoretical studies were performed to generate both slow and fast light in SBN crystal. These studies will help in design of optical delay lines for photonic applications.

DEPARTMENT OF CHEMISTRY

Dr. R. K. Dey

Designation : Professor
Mobile : 9439485624, 8917570944
E-mail : ratan.dey@cuj.ac.in, rkdey@rediffmail.com

Research Projects

1. **Removal of fluoride using new hybrid sorbents of polymers-mixed metal oxides: development of fluoride removal kit for rural use Funding Agency: University Grants Commission, Govt. of India**
   Amount : 15.0) Lakhs
   Duration : July, 2013-June2016

Outcome/Objective

- Study of physicochemical and geochemical feature of fluoride in drinking water.
- Development of new fluoride selective hybrid materials.
- Study of kinetics of thermodynamics of fluoride removal by prepared materials.
- Regeneration and reuse study of the material for development of fluoride removal kit.

Dr. Raj Bahadur Singh

Designation : Assistant Professor
Mobile : 8877019873
E-mail : rajbahadur.iitb@gmail.com; raj.singh@cuj.ac.in

Research Projects

1. **Synthesis of biologically active illudalane class of natural products**
   Funding Agency : DST
   Amount : Rs. 24,53,000/-
   Duration : 3 years

Outcome/Objective

- Illuladane sesquiterpenes are biologically active metabolites of both fungi of Basidiomycotina subdivision and ferns of Pteridaceae family. Illudalanes typically have the indane or indanone containing keleton. Till date diverse types of natural products having common skeleton have been isolated. To the best of my knowledge no total synthesis of this class of recently isolated biologically active molecules is reported. Hence we are attracted to synthesize these targets and successfully synthesized three of them.

2. **Total Synthesis of cytotoxic, antiviral sesquiterpenoids**
   Funding Agency : SERB DST
   Amount : Rs. 26,40,000/-
   Duration : 3 years

Outcome/Objective

- The bioactive molecules proposed for this project have low molecular weight, unique indane or indanone structure and different side chains or functionalities. Most importantly the target molecules are given for this project show biological activities. Especially the cytotoxic granuloinden A, B and anti- TMV active tabasesquiterpene A-C, are the main target compared with other molecules.

Dr. Sabyasachi Bhunia

Designation : Assistant Professor
Mobile : 8001285730
E-mail : sabyasachi.bhunia@cuj.ac.in

Research Projects

1. **Rapid access to synthetically useful complex carbo- and heterocycles through cascade reactions and continuous flow microreactor processes**
   Funding Agency : SERB
   Amount : 38.94 Lakh
   Duration : 3 years

Outcome/Objective

- The project covers a vast sphere of innovative synthetic chemistry (fine chemicals, pharmaceuticals, agro chemistry, food, biology etc.) which will influence the Indian science to a great extent. Fulfilling the principal requirement of strategically important area of Indian research, the PI, with his outstanding research capability, can make a major impact on the research. Contribution to Indian excellence and competitiveness from a successful project is thus highly significant. This project will be used as an instrument to train future generation of chemists. The current interest focuses on discovery of new efficient ways to construct complex carbo- & hetero- cycles from simple and readily available precursors.

2. **Organic Transformations Involving Activation of C-C Multiple Bonds**
   Funding Agency : UGC
   Amount : 6.0 Lakh
   Duration : 2 years

Outcome/Objective

- The proposed chemistry has been deliberately focused on the synthesis of a large array of heterocyclic compounds. The current interest focuses on discovery of new efficient ways to construct complex carbo- & hetero- cycles from simple and readily available precursors. It is expected that the proposed research will lead to identification of a few new bioactive compounds and will work closely with biologists and medicinal chemists to identify any bioactive compound arising out of the project.

Dr. Soumen Dey

Designation : Assistant Professor
Mobile : 9661399711
E-mail : soumen.dey@cuj.ac.in

Research Projects

1. **Environmentally Clean Approach to Synthesize Porphyrinogen, a Potential Host-guest Sensor and Efficient Electron Reservoir**
   Funding Agency : SRRB-DST, New Delhi
   Amount : INR 24,50,000/- (Twenty four lakh fifty thousand only)
   Duration : 3 years (2014-17)

Outcome/Objective

- Developed some eco-friendly strategy for synthesis of ligands, metal complexes and their uses in removal of toxic elements.

School of Natural Resource & Management

DEPARMENT OF ENVIRONMENTAL SCIENCES

Dr. Manoj Kumar

Designation : Professor
Mobile : 9431901969, 7091779521
E-mail : manoj.kumar@cuj.ac.in

1. **Hydrological modeling of land surface processes over Sabarmati river basin**
   Centre/Department : Dept. of Agriculture Meteorology, GAU Anand
   Name of Principal Investigator : Dr. Manoj Kumar
   Funding agency collaborator : Dr. P. Sanjeeva Rao
   Name of the Funding Agency : DST, GOI, New Delhi
   Duration of the project : 2002-05 (Completed)
   Budget : Rs. 8.34 Lakhs

Outcome/Objective

- In the present project, detailed studies modeling of watershed/catchment area was done after verification and quality check of LASPEX-97, crop specific, irrigation, surface and rainfall data. Water balance studies by Thornthwaite & Mather method using different methodologies, development of Agroclimatic characteristics of Sabarmati river basin under LASPEX area, and surface layer simulation over LASPEX-97 sites using Monthly/seasonal variation of different land surface parameters were studied. Development of regression model for soil surface temperature, air temperature, net and net long wave radiation, friction velocity, roughness length, exchange coefficient for momentum, stress and aerodynamic resistance were also done. These forecasts were simulated with different data sets and found very encouraging results.

2. **Observational study of land surface atmosphere interaction in the monsoon trough along its extreme eastern end**
   Centre/Department : Centre of Excellence in Climatology
   Name of Principal Co-Investigator : Dr. Manoj Kumar
   Funding agency collaborator : Dr. P. Sanjeeva Rao
   Name of the Funding Agency : DST, GOI, New Delhi
   Duration of the project : 2006-10
   Budget : Rs. 66.0 Lakhs

Outcome/Objective

- Under this project, automatic weather observatory augmented with surface observatory (LATAMOS) was established within the campus which appears to be one of the best observatory available in India at present. A complete data bank of meteorological parameters has been created and modeling of some atmospheric processes is under progress. Atmospheric Sciences Laboratory-cum-Office has been created near the Observatory in the Campus.
- Having collected slow and fast response data and establishment of data bank centre, our scholars are engaged in editing, calibration, post processing and analysis. Land surface processes including soil moisture and soil heat flux analysis, study of energy fluxes by different methods. Statistical model has been tested for the estimation of sensible heat flux using ARIMA model. Study has also been done for the variation and behavior of surface layer turbulent parameters during different extreme weather conditions.

3. **Energy & Mass Exchange in Vegetative System**
   Centre/Department : Centre of Excellence in Climatology

Name of Principal Investigation : Dr. Manoj Kumar
Name of ISRO Collborator : Dr. (Mrs.) S. Panigrahi & Dr. Bimal K Bhattacharya
Name of the ISRO center : Space Application Centre, ISRO, Ahmedabad
Duration of the project : 2008 to 2013
Budget : Rs. 13 Lakhs (Received)

Outcome/Objective

- Abstract This collaborative project is about long term analysis on global radiation, diffused radiation and diffused fraction along with a model for gross primary productivity over Indian region.
- The extent of solar dimming over representative climate types in India has been brought out through this study. The increase in diffuse insolation indicated presence of dust aerosols. Different models were described by different investigators in which diffuse fraction was calculated by using transmissivity. In the present study models for diffuse fraction developed for four stations of India i.e. Jodhpur, New Delhi, Nagpur and Kolkata. These models were compared with the existing models. Development of daily model upto some limit solved the problem of data availability of KD. It also gave explanation about which season is causing more deviation in predicting daily and monthly diffuse fraction in Shillong. Developed regional model in case of monthly can be use for predicting diffuse fraction in different parts of country except stations from hilly terrain (because of elevation problem) and arid region (more contribution of dust aerosols).

4. Short term oscillation study of surface boundary layer during total solar eclipse on 22nd July 2009 and 15th January 2010

Centre/Department : Centre of Excellence in Climatology
Name of Principal Investigator : Dr. Manoj Kumar
Name of Co-Principal Investigator : Dr. N C Mahanti
Name of ISRO Collborator : Dr. (Mrs.) Kusuma G Rao
Name of the ISRO Center : ISRO HQ., Bangalore, Govt. of India under its Climate and Weather of Sun-Earth System (CAWSES) – India programme (2009-2010)
Duration of the project : 2009-2011
Budget : RS 2.0 Lakhs

Outcome/Objective

- **Abstract:** ISRO HQ. Bangalore identified given us responsibilities to cover two important celestial events of (i) total solar eclipse on 22nd July, 2009, where totality path was at Ranchi (97%), Patna (100%), Gujarat region (100%) in the early morning time (5:30-7:30 hrs) and (ii) one of the longest annular solar eclipse on 15th January, 2010 (From 11:30 – 16:00 hrs) with most affected parts were southern India. During these two events, study have been made to identify the effects of solar eclipse on lower atmosphere turbulence, on weather parameters and over crop physiology in different parts of country, especially at Ranchi, Anand and Thrissur.
- Preliminary study on the effects of TSE on different crop community and environment has been analysed. Two types of plants C3 type plants (whose stomata remains open during night time, i.e. Cactus and Mogra) and C4 type plants (whose stomata opens during day time i.e. in light, e.g. touch-me-not, Imli).
- Observations on Fluctuations within the lower atmospheric layer has been studied and ultra-violet radiation type B has been studied and found that it has been drastically decreased during peak time of maximum obstruction and remained 10% of its original value.

5. An ARFI network observatory at BIT Mesra, Ranchi

Centre/Department : Centre of Excellence in Climatology
Name of Principal Investigator : Dr. Manoj Kumar
Name of Co-Principal Investigator : Dr. N C Mahanti
Name of ISRO Collborator : Dr. K. Krishnamoorthy & Dr. S. Sureshbabu
Name of the ISRO center : Space Physics Laboratory, Vikram Sarabhai Space Centre Thiruvananthapuram under ISRO GBP Programme
Duration of the project : From 2009- 2013 (June 30)

Budget : Total outlay of Rs. 35.0 Lakhs+Instrument (MWR) of Rs. 100.0 Lakhs

Outcome/Objective

- Abstract: Under this project, two instruments viz., nine wave band aethalometer and seven band sunphotometer have been installed and multi-wave radiometer will be installed soon. During the experimental year of 2009-13, experiment was conducted to study the effect of dust and rain events on aerosol optical properties and radiation for this region using radiometer data as well as micrometeorological tower observational system data. During the project tenure, Aerosol Properties over Ranchi during rainy season, Aerosol and Black carbon over Indo-Gangetic basin during the period of Lighting festival (Diwali) in the Indo-Gangetic Plains using Aethalometer and back trajectory datasets, and Aerosol black carbon and Aerosol optical Depth from Ranchi during different seasons were analysed in details. Study on black carbon status at different field conditions and environment influencing the radiative transfer process was also carried out. Low values of BC during afternoon hours have been attributed to the dispersion of aerosols, due to increase in boundary layer height. BC peaks during morning and evening have been attributed to the increase in traffic density and various activities during these hours.

6. **An ABL&C Centre at BIT Ranchi**

Centre/Department : Centre of Excellence in Climatology
Name of Principal Investigator : Dr. Manoj Kumar
Name of Co-Principal Investigator : Dr. N C Mahanti
Name of ISRO Collborator : Dr. K. Krishnamoorthy & Dr. Kirankumar
Name of the ISRO center : Space Physics Laboratory, Vikram Sarabhai Space Centre Thiruvananthapuram under ISRO GBP Programme
Duration of the project : From 2010- 2014
Budget : Total outlay of Rs. 80.0 Lakhs+Instrument (Dr. Pishoroty radiosonde) of Rs. 55.0 Lakhs (Provided by ISRO, SCL, etc.)

Outcome/Objective

- Abstract: On a long-term basis, the atmospheric boundary layer is highly complex and least studied across the country. The diurnal pattern and dynamic nature of boundary layer that determines the ventilation coefficient and the distribution of atmospheric aerosols, trace gases, dust etc is regulated and contained within the boundary layer. The ABLN&C project of ISRO aims at studying atmospheric boundary layer and its evolution through network study over Indian region, from its broadly distributed network of aerosol observatories across the country over distinct geographical environments (such as coastal, continental, arid, urban, rural and industrial). The observations, so far have been limited to point measurements through balloons, flux towers etc. These networks would enhance the understanding of continental-scale boundary layer distribution and height. This would help in improving the inputs to climate models and the boundary layer schemes in addition to pollution studies.

7. **Dynamical Coupling and parameterization and its Role in the Energy and Momentum Budget of the Middle Atmosphere coupled with land surface processes along eastern end of monsoon trough**

Centre/Department : Centre of Excellence in Climatology
Name of Principal Investigator : Dr. Manoj Kumar
Name of ISRO Collborator : Dr. (Mrs.) Kusuma G Rao
Name of the ISRO center : ISRO HQ., Bangalore
Duration of the project : From 2010-2014 or more
Budget : Total outlay of Rs. 70.0 Lakhs (On Instrument /sensor mode)

Outcome/Objective

- Abstract : Under this scheme, special field campaign was conducted four times in a year. During the special field campaign BIT Mesra has been recognized as one of the nodal agency to conduct filed campaign on surface as well as upper air sounding. The data generated out was being shared with ISRO FTP under a protocol

and modeling studies before satellite launch is being carried out. BIT has participated in the field campaign for 24th December, 2010 GSLV launch and 21st April 2011 PSLV launc from which Communication satellite was sent. Our centre is being providing data on surface boundary layer as well as upper air sounding to ISRO for modeling before launch.

8. **PRWONAM Campaign activity and MBLM data analysis**

Centre/Department : Centre of Excellence in Climatology

Name of Principal Investigator : Prof. N.C. Mahanti

Name of ISRO Collborator : Dr. (Mrs.) Kusuma G Rao

Name of BIT Collaborator : Dr. Manoj Kumar

Name of the ISRO center : ISRO HQ., Bangalore

Duration of the project : From 2010-2014 or more

Budget : Total outlay of > Rs. 50.0 Lakhs

Outcome/Objective

- Abstract : In this work, the importance of investigation on terrestrial processes in humid areas for mankind's living environment protection and local economy development as well as its present state of the art are to be elucidated. A coupling model, which evaluates heat, mass, momentum and radiative fluxes in the earth-atmosphere continuum system, will be developed for simulating microclimate over plant and bare soil. Especially, it will be focussed on the details of turbulence transfer. For illustration, numerical simulation of the water-heat exchange processes at eastern end of monsoon trough axis was conducted.
- Under this collaborative project with ISRO HQ., upper air atmospheric boundary layer study was undertaken at the time of satellite launching. GPS sonde system alongwith radiosonde transmitter has been sanctioned by the ISRO. To achieve the objectives, ISRO HQ. supplied GPS sonde, balloons and other consumables. GPS receiver has been manufactured in VSSC (ISRO), Trivandrum lab with 403.5 MHz frequency and GPS sonde is being supplied by Semi Conductor Laboratory, Chandigarh. A 15m Mini Boundary Layer Mast (MBLM) Tower equipped with weather sensors of RH/AT, WS/WD, Soil Temperature/moisture (at different depths),

9. **Satellite Application in Land Surface Atmosphere coupled Study over Eastern Part of the Country (An INSAT-3D Data Retrieval observatory at Birla Institute of Technology Mesra, Ranchi)**

Centre/Department : Centre of Excellence in Climatology

Name of Principal Investigator : Dr. Manoj Kumar

Name of Co- Principal Investigator : Dr. N C Mahanti & Dr. A C Pandey

Name of ISRO Collborator : Dr. C M Kistwal

Name of the ISRO center : New project approved by MOG, SAC (ISRO), Ahmedabad

Duration of the project : From 2011-Continuing

Budget : First year grant of Rs. 9.5 Lakhs

Outcome/Objective

- Abstract : On a long-term basis, the atmospheric boundary layer is highly complex and least studied across the country. The diurnal pattern and dynamic nature of boundary layer that determines the ventilation coefficient and the distribution of atmospheric aerosols, trace gases, dust etc is regulated and contained within the boundary layer. The INSAT-3D Data Utilization project of SAC, ISRO aims at studying atmospheric boundary layer and its evolution through network study over Indian region in 3 dimensional way. The INSAT-3D Science and Application plan aim to focus on the exploration of new scientific grounds in different broad areas like, energy balance validation, retrieval of atmospheric profiles from satellite sounder and validation with ground equipment, monsoon and cyclone study, land surface processes coupled with atmospheric boundary layer. This would help in improving the inputs to climate models and the boundary layer schemes in addition to pollution studies. As part of this program, a station at Ranchi will be a potential and strategic location in the northern part of the country.
- As the proposed satellite would be equipped with different sounders including RH/AT, WS/

WD, pressure, SST, albedo, radiation; these will be validated with ground data and then suitable parameterization scheme on land surface coupled with atmospheric boundary layer will be developed.

10. **Surface process observational studies coupled with atmospheric transfer interaction along eastern end of monsoon trough**
Centre/Department : Centre of Excellence in Climatology
Name of Principal Investigator : Dr. Manoj Kumar
Name of Co- Principal Investigator : Dr. N C Mahanti
Funding agency collaborator : Dr.(Mrs.) Swati Basu
Name of the Funding Agency : MoES, GOI, New Delhi
Duration of the project : First Phase: From 2011-2014
Budget : Total Rs. 53.0 Lakhs

Outcome/Objective

- The CTCZ field campaign conducted by MOES aimed at studying atmospheric boundary layer and its evolution coupled with surface layer processes through network study over Indian region, from its broadly distributed network of aerosol observatories across the country over distinct geographical environments (such as coastal, continental, arid, urban, rural and industrial). The observations, so far conducted under have been limited to point measurements through balloons, flux towers etc. Under previous DST projects along with the national carbon project, 4 flux towers are already available in CTCZ area including BIT, Mesra, Ranchi. So CTCZ can use BIT Ranchi tower for its next phase field campaign with strengthening it. Requirement of additional instruments, calibration, etc. are being worked out. So, surface fluxes and energy balance under different climatic conditions over the CTCZ domain are doable and will be included.

11. **INSAT – 3D data utilization for the study of land surface processes**
Centre/Department : Centre for Environmental Sciences
Name of Principal Investigator : Dr. Manoj Kumar
Name of ISRO Collaborator : Dr. C.M. Kistwal
Name of the ISRO Centre : SAC, Ahemdabad
Duration of the project : 2013-2015
Budget : RS 3.0 Lakhs

Outcome/Objective

- **Abstract** : In this project, the dynamics and thermodynamics of the convective boundary layer coupled with surface boundary layer during pre-monsoon severe thunderstorm and monsoon season cyclone system over the region using already existing observational system at BIT Mesra (Includes micromet tower equipped with slow and fast response sensors, radiation, soil moisture, soil heat flux, electric field meter for lightning etc.) were studied. For this study, satellite data especially INSAT 3D data being utilized. It was also proposed to utilize data for upper air dynamics study and achieved the objectives also.

Dr. Bhaskar Singh

Designation : Assistant Professor
Mobile : 8292513945, 8292513945
E-mail : bhaskar.singh@cuj.ac.in

Research Projects

1. **Transesterification of biodiesel from *Millettia pinnata* oil from nano-CaO loaded compounds**
Funding Agency : UGC
Amount : Rs. 6,00,000/-
Duration : 22/01/2015 to 31/03/2018

Outcome/Objective

- Outcome of the project: Nano-CaO has been synthesized as heterogeneous catalyst for synthesis of biodiesel. Reaction variables (alcohol to oil molar ratio, catalyst amount & reaction temperature) have been optimized at a

fixed reaction time by Box-Behnken design. A high conversion (>96.5%) has been obtained at 11:1 (alcohol to oil molar ratio), 3.675 wt. % catalyst (with respect to oil) at 60 oC in 2 h. A high surface area (67.781 m2/g) with a small pore diameter of 3.302 nm was found that could be the reason for its high catalytic activity.

Dr. Kuldeep Bauddh

Designation : Assistant Professor
Mobile : 9934258641, 9934258641
E-mail : Kuldeep.bauddh@cuj.ac.in

Research Projects

1. **Effect of cadmium (Cd) on yield and quality of *Ricinus communis* seeds and oil**
   Funding Agency: University grant commission
   Amount : Rs. 6,00,000
   Duration : 2 years

Outcome/Objective

- The castor plant cultivated in control, 20, 50 and 100 mg Cd/Kg Cd contaminated soil produced 3.420, 3.122, 2.985 and 2.045 kg fresh weight (FW) plant-1 biomass respectively at the end of the experiment (150 days). The root and shoot length was reduced significantly when compared with the control plants. The root and shoots dry weights were found to be decreased by 14.21, 18.24 and 20.11 % respectively of the plants grown in the 20, 50 and 100 mg Cd/Kg Cd contaminated soil respectively than that of controlled plants. It appears that the mature castor plants possess a good tolerance to the toxic heavy metal, Cd. There were no distinct morphological differences (general appearance of plants and structure of leaf, stem and fruit bearing parts etc.) between plants grown on control and contaminated soil. The soil quality was found to be improved in terms of pH, EC and nutrient content after cultivation the *R. communis* plants.

2. **Phytomanagement of the mining dump soil of West Singbhum, Jharkhand by using bioenergy plants**
   Funding Agency : Science of Engineering and Research Board (SERB)
   Amount : Rs. 26,76,000.00
   Duration : 03 years

Outcome/Objective

- In the present project, the mining area in the vicinity of Singbhum district of state Jharkhand has been selected which have several mining dump sites. *Bioenergy plants Ricinus communis, Jatropha curcas, Millettia pinnata*, and *Populus spp* will be planted on in the contaminated soil of this area. On the basis of ability of restoration of contaminated soil as well as plants growth and productivity and tolerance mechanisms, the most suitable and efficient plant will be selected for further studies. The amendments like inorganic, organic and biofertilizers will be applied to speed up the process of restoration.

Dr. Purabi Saikia

Designation : Assistant Professor
Mobile : 7903654200, 9546757398
E-mail : purabi.saikia@cuj.ac.in

Research Projects

1. **Monitoring spatio-temporal dynamics of Above Ground Biomass in forests ecosystems using Airborne L & S band SAR images**
   Funding Agency : Space Application Centre, ISRO, Ahmedabad, GoI
   Amount : 24.3 lakh
   Role : Co-Principal Investigator
   Duration : 3 years (Feb 2018-Jan 2021)

Project Objectives

- To estimate and compare the above ground biomass (AGB) during various vegetative phases using airborne L & S band SAR with space borne SAR.
- To estimate the rate of vegetation degradation by means of AGB during the various observation periods/ seasons.

Probable Outcomes

- Spatial variation of Above Ground Biomass in Satpura Tiger Reserve Forest.
- Phyto-sociological composition of tree species of Satpura Tiger Reserve.
- Phenological observations of forest in Satpura Tiger Reserve.
- Spatial variation in vegetation degradation of Satpura Tiger Reserve Forest.

2. Mapping and Quantitative Assessment of Plant Resources and its Distribution in Madhya Pradesh, Central India

Funding Agency : Department of Biotechnology (DBT), New Delhi, GoI
Amount : 212.26 lakh
Role : Co-Principal Investigator
Duration : 4 years (June 2017-May 2021)

Project Objectives

- Assessing the quantitative, qualitative characteristics and floristic composition of vegetation of Madhya Pradesh
- Studying the population and regeneration status of documented tree species
- Identifying the threats on plant resources and enlisting the threatened species.

Probable Outcomes

- Quantitative assessment of various trees, shrubs and herbs found in Madhya Pradesh, from the sampled transects along with their maximum individual, minimum individual as well as mean from the different forested grids of Madhya Pradesh.
- Qualitative analysis of various plant species and their diversity pattern found in Madhya Pradesh.
- The population and regeneration characteristics of the recorded plant species will be studied.
- Documentation of threatened species along with the identification of threats on vegetation.

3. Monitoring and Mapping of Forest Communities with special reference to Invasive Plant Species using AVIRIS – NG

Funding Agency : Space Application Centre, ISRO, Ahmedabad, GoI
Amount : 20.5 lakh
Role : Co-Principal Investigator
Duration : 3 years (Dec. 2017- Nov. 2020)

Project Objectives

- To study and classify the major forests composition in Mudumalai Reserve
- Forests, Tamilnadu.
- To identify and quantify selected Invasive plant species (*Parthenium hysterophorus, Lantana camara and Chromolaena odorata*) of the forests.
- To identify the common associates of dominant invasive species in the region.

Probable Outcomes

- Status of species composition in Mudumalai Reserve Forests, Tamilnadu.
- Invasive species (dominant) distribution map & final technical report (which can be used in defining the management strategy in curbing the risk of invasion in natural forest and help in the assessment of future risk).
- Spatial association of major plant species with dominant invasive species.
- Significance of various spectral bands of AVIRIS –NG data.

4. Status, Distribution and Composition of Sal Forests of Ranchi, Jharkhand, East India in relation to Microclimatic as well as Edaphic conditions

Funding Agency : Science and Engineering Research Board (SERB), New Delhi, GoI
Amount : 29.36 lakh
Role : Principal Investigator
Duration : 3 years (May 2016- April 2019)

Project Objectives

- To study the floristic composition along with its quantitative and qualitative characteristics of Sal Forests of Ranchi, Jharkhand, East India
- To study the population & regeneration status

of documented tree species of Sal Forests of Ranchi, Jharkhand, East India
- To study the distribution pattern and its present status of Sal Forests of Ranchi, Jharkhand, East India
- To study the microclimatic variation of different Sal forests of Ranchi, Jharkhand, East India
- To study the soil physico-chemical parameters of different Sal forests of Ranchi, Jharkhand, East India

Project Outcomes

The findings of the study provide some important ecological basis including its plant composition, microclimatic as well as soil physic-chemical variations depending upon which effective management strategies can be developed for the restoration and sustainable management of endangered plant species of the forests of Ranchi.
It also gave an idea about the population and regeneration status of documented tree species, its distribution pattern and present status of Sal Forests of Ranchi, Jharkhand, Eastern India.

5. **Phytosociological analysis of Forests of Ranchi, Jharkhand, India**
   Funding Agency : University Grant Commission (UGC), New Delhi, GoI
   Amount : 06.00 lakh
   Role : Principal Investigator
   Duration : 2 years (Jan 2015-March 2017)

Project Objective

- To study the population structure and regeneration status of selected tree species
- To classify and quantify the forests of Ranchi with the help of satellite remote sensing
- To study the plant utilization pattern of the available plant species of the forests of Ranchi.

Project Outcomes

- The study gave some important ecological basis based on the species composition of the forests of Ranchi which help in developing effective management strategies for the restoration and sustainable management of endangered plant species of the forests of Ranchi.
- It also gave the population and regeneration status of selected plant species of the forests of Ranchi and also highlighted the importance of plant species in socio-economic development of the local people of the region

Dr. Nirmali Bordoloi

Designation : Assistant Professor
Mobile : 09401739018, 09864816651
E-mail : nirmalibordoloi12@gmail.com

Research Projects

1. **Fertilizer Management for Mitigation of Greenhouse Gas Nitrous Oxide (N_2O) Emission from Rice-Wheat Cropping Systems of Jharkhand, Eastern India**
   Funding Agency : SERB, Govt. of India
   Amount : 39.29 lakh
   Duration : 3 years

Outcome/Objective

- Recently received the sanction order. The main goal of the project is to reduce major greenhouse gas N_2O emissions from rice-wheat ecosystems without compromising the productivity.

2. **Impact of organic amendments on carbon sequestration and soil quality under maize-wheat cropping system**
   Funding Agency : UGC, Govt. of India
   Amount : 6 lakh
   Duration : 2 years

Outcome/Objective

- Recently approved. The main objective of the project is to evaluate the effects of various organic and inorganic amendments on soil heath parameters, soil C dynamics and crop productivity.

DEPARTMENT OF GEOINFORMATICS

Dr. Arvind Chandra Pandey

Designation : Professor
Mobile : 9955492100
E-mail : arvindchandrap@yahoo.com
arvind.pandey@cuj.ac.in

Research Projects

1. **Airborne Hyper spectral data forest health and Biomass Estimation in Sholayar RF Kerala**
Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 23 lakhs
Role : Principal Investigator
Duration : 3 years (Dec. 2017- Nov. 2020)

Project Objectives

- Evaluation of forest health of Sholayar Reserve Forest.
- Estimation of Above Ground Biomass (AGB) in the reserve/forest area.
- Estimation of various biophysical parameters and study the forest dynamics.

Project Outcomes

- A number of vegetation health related parameters are being studied based on remote sensing techniques using hyperspectral AVIRIS-NG Data. Project will lead to better species/ vegetation type classification and improved **forest health assessment and Biomass Estimation.**
- **Publication:** Ahmad, Shahbaz., Pandey, A.C., Kumar, A. Lele, Nikhil., Bhattacharya, Bimal. (2019). "*Forest health estimation in Sholayar Reserve Forest, Kerala using AVIRIS-NG hyperspectral data*". Spatial Information Research. https://doi.org/10.1007/s41324-019-00260-6

2. **Retrieval of biophysical parameters and estimation of gross primary productivity in Indian forests using GISAT**
Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 22.4 lakhs
Role : Principal Investigator
Duration : 3 years (July 2017- June 2020)

Objectives

- To develop model for bio-physical products (LAI and fAPAR) using multispectral data over forests using empirical and model based algorithms.
- To develop model for Gross primary productivity (GPP) estimation.
- To validate the model estimates with in-situ data and other global products.

Project Outcomes

- Estimation of various Bio-physical and bio-chemical parameters e.g. LAI and fAPAR etc. using model based algorithm for Dalma forest and Gross Primary Productivity of this region. Establishing correlations between field based data and remotely sensed estimates.

3. **Detailed lithological, structural and geomorphological mapping and modelling for mineral prognostication in parts of Singhbhum Shear Zone, Jharkhand, India using Airborne L& S bands SAR images**
Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 25.24 lakhs
Role : Principal Investigator
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objectives

- Delineating tectonic lineament relationship with drainage evolution using various filtering techniques over L and S Band SAR data.
- Macro and micro topographical roughness estimation through L and S band SAR data focusing on iron-mineralized laterites.
- Assessment of polarization responses of SAR data to differential weathering of lithological units and identification of hidden lineaments and abandoned drainage.
- Deducing backscatter profiles employing PCA,

Classified and ratio images using image fusion techniques using L & S band SAR and optical satellite data.
- Geospatial modeling for mineral prognostication based on specific lithological, structural and geomorphological characterization deduced through L & S band SAR data.

Project Outcomes

- The macro and micro topographical roughness estimation will provide detection of iron-mineralized laterites.
- Assessment of polarization responses of SAR data will help in identification of different lithological units, hidden lineaments and drainage patterns.
- Geospatial modeling for mineral prognostication may provide delineation of new zone of expected mineralization based on tectonic lineament mapping through high resolution L Band SAR data.

4. Flood prognosis and inundation mapping using Airborne SAR (L bands) images" using Airborne L& S bands SAR images

Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 24.03 lakhs
Role : CO- PI
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objectives

- Evaluation of flood water characteristics (Load vs Depth) -during flood progression and flood regression (temporal assessment).
- Assessment of flood inundation under urban clutter and vegetated area.
- Mapping pre-flood/during flood moisture zones to delineate possible flood route and evacuation sites.

Project Outcome

- The flood route and evacuation cite demarcation during flooding as well as flood water depth with sediment load characteristics assessment would help in flood hazards assessment and its mitigation using microwave.

5. Monitoring spatio-temporal dynamics of Above Ground Biomass in forests ecosystems using Airborne L & S band SAR images

Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 24.3 lakhs
Role : CO-PI
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objective

- To estimate and compare the above ground biomass (AGB) during various vegetative phases using airborne L & S band SAR with space borne SAR.
- To estimate the rate of vegetation degradation by means of AGB during the various observation periods/ seasons.

Project Outcome

- Spatial variation of Above Ground Biomass in Satpura Tiger Reserve Forest.
- Phyto-sociological composition of tree species of Satpura Tiger Reserve.
- Phenological observations of forest in Satpura Tiger Reserve.
- Spatial variation in vegetation degradation of Satpura Tiger Reserve Forest.

6. Feasibility of cost effective and sustainable means of harnessing water stored in stone mine pits: A pilot study of Sanga Village, Ranchi, India

Funding Agency : CWC, Columbia University, New York
Amount : 5.9 lakhs
Role : CO- PI
Duration : July 2014-June 2015

Dr. Amit Kumar

Designation : Assistant Professor
Mobile : 8603860814, 7004773095
E-mail : amit.iirs@gmail.com, amit.kumar@cuj.ac.in

Research Projects

1. **Monitoring spatio-temporal dynamics of Above Ground Biomass in forests ecosystems using Airborne L & S band SAR images**
Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 24.3 lakhs
Role : Principal Investigator
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objective

- To estimate and compare the above ground biomass (AGB) during various vegetative phases using airborne L & S band SAR with space borne SAR.
- To estimate the rate of vegetation degradation by means of AGB during the various observation periods/ seasons.

Project Outcome

- Spatial variation of Above Ground Biomass in Satpura Tiger Reserve Forest.
- Phyto-sociological composition of tree species of Satpura Tiger Reserve.
- Phenological observations of forest in Satpura Tiger Reserve.
- Spatial variation in vegetation degradation of Satpura Tiger Reserve Forest.

2. **Mapping and Quantitative Assessment of Plant Resources and its Distribution in Madhya Pradesh, Central India**
Funding Agency : Department of Biotechnology (DBT), GOI, New Delhi.
Amount : 212.26 lakhs
Role : Principal Investigator
Duration : 4 years (June 2017-May 2021)

Project Objectives

- Assessing the quantitative, qualitative characteristics and floristic composition of vegetation of Madhya Pradesh
- Studying the population and regeneration status of documented tree species
- Identifying the threats on plant resources and enlisting the threatened species.

Probable Outcomes

- Quantitative assessment of various trees, shrubs and herbs found in Madhya Pradesh, from the sampled transects along with their maximum individual, minimum individual as well as mean from the different forested grids of Madhya Pradesh.
- Qualitative analysis of various plant species and their diversity pattern found in Madhya Pradesh.
- The population and regeneration characteristics of the recorded plant species will be studied.
- Documentation of threatened species along with the identification of threats on vegetation.

3. **Monitoring and Mapping of Forest Communities with special reference to Invasive Plant Species using AVIRIS – NG**
Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 20.5 lakhs
Role : Principal Investigator
Duration : 3 years (Dec. 2017- Nov. 2020)

Project Objectives

- To study and classify the major forests composition in Mudumalai Reserve
- Forests, Tamilnadu.
- To identify and quantify selected Invasive plant species (*Parthenium hysterophorus, Lantana camara and Chromolaena odorata*) of the forests.
- To identify the common associates of dominant invasive species in the region.

Project Outcome

- Status of species composition in Mudumalai Reserve Forests, Tamilnadu.
- Invasive species (dominant) distribution map

& final technical report (which can be used in defining the management strategy in curbing the risk of invasion in natural forest and help in the assessment of future risk).
- Spatial association of major plant species with dominant invasive species.
- Significance of various spectral bands of AVIRIS –NG data.

4. Retrieval of biophysical parameters and estimation of gross primary productivity in Indian forests using GISAT

Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 22.4 lakhs
Role : CO- PI
Duration : 3 years (July 2017- June 2020)

Project Objectives

- To develop model for bio-physical products (LAI and fAPAR) using multispectral data over forests using empirical and model based algorithms.
- To develop model for Gross primary productivity (GPP) estimation.
- To validate the model estimates with *in-situ* data and other global products.

Project Outcomes

- Estimation of various Bio-physical and bio-chemical parameters e.g. LAI and fAPAR etc. using model based algorithm for Dalma forest and Gross Primary Productivity of this region. Establishing correlations between field based data and remotely sensed estimates.

5. Detailed lithological, structural and geomorphological mapping and modelling for mineral prognostication in parts of Singhbhum Shear Zone, Jharkhand, India using Airborne L& S bands SAR images

Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 25.24 lakhs
Role : CO- PI
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objectives

- Delineating tectonic lineament relationship with drainage evolution using various filtering techniques over L and S Band SAR data.
- Macro and micro topographical roughness estimation through L and S band SAR data focusing on iron-mineralized laterites.
- Assessment of polarization responses of SAR data to differential weathering of lithological units and identification of hidden lineaments and abandoned drainage.
- Deducing backscatter profiles employing PCA, Classified and ratio images using image fusion techniques using L & S band SAR and optical satellite data.
- Geospatial modeling for mineral prognostication based on specific lithological, structural and geomorphological characterization deduced through L & S band SAR data.

Project Outcomes

- The macro and micro topographical roughness estimation will provide detection of iron-mineralized laterites.
- Identification of different mineralized zones will be obtained by backscatter profile of SAR and optical data.
- Assessment of polarization responses of SAR data will help in identification of different lithological units, hidden lineaments and drainage patterns.
- Geospatial modeling for mineral prognostication may provide delineation of new zone of expected mineralization based on tectonic lineament mapping through high resolution L Band SAR data.

6. Flood prognosis and inundation mapping using Airborne SAR (L bands) images using Airborne L& S bands SAR images

Funding Agency : Space Application Centre, ISRO, Ahmedabad
Amount : 24.03 lakhs
Role : CO- PI
Duration : 3 years (Feb 2018 – Jan 2021)

Project Objectives

- Evaluation of flood water characteristics (Load vs Depth) -during flood progression and flood regression (temporal assessment).
- Assessment of flood inundation under urban clutter and vegetated area.
- Mapping pre-flood/during flood moisture zones

to delineate possible flood route and evacuation sites.

Project Outcome

- The flood route and evacuation cite demarcation during flooding as well as flood water depth with sediment load characteristics assessment would help in flood hazards assessment and its mitigation using microwave data.

7. **Airborne Hyper spectral data forest health and Biomass Estimation in Sholayar RF Kerala**
   Funding Agency : Space Application Centre, ISRO, Ahmedabad
   Amount : 23 lakhs
   Role : CO- PI
   Duration : 3 years (Dec. 2017- Nov. 2020)

Project Objectives

- Evaluation of forest health of Sholayar Reserve Forest.
- Estimation of Above Ground Biomass (AGB) in the reserve/forest area.
- Estimation of various biophysical parameters and study the forest dynamics.

Project Outcomes

- A number of vegetation health related parameters are being studied based on remote sensing techniques using hyperspectral AVIRIS-NG Data. Project will lead to better species/vegetation type classification and improved forest health assessment and Biomass Estimation.
- Publication: Ahmad, Shahbaz., Pandey, A.C., Kumar, A. Lele, Nikhil., Bhattacharya, Bimal. (2019). "*Forest health estimation in Sholayar Reserve Forest, Kerala using AVIRIS-NG hyperspectral data*". Spatial Information Research. https://doi.org/10.1007/s41324-019-00260-6.

8. **Feasibility of cost effective and sustainable means of harnessing water stored in stone mine pits: A pilot study of Sanga Village, Ranchi, India**
   Funding Agency : CWC, Columbia University, New York
   Amount : 5.9 lakhs
   Role : Principal Investigator
   Duration : July 2014-June 2015

Outcome/Objective

- to provide water from local resources to the local communities through sustainable solution methods.

Dr. Bikash Ranjan Parida

Designation : Assistant Professor
Mobile : 8130848255, 8130848255
E-mail : bikash.parida@cuj.ac.in

Research Projects

1. **Flood prognosis and inundation mapping using Airborne SAR (L bands) images using Airborne L& S bands SAR images**
   Funding Agency : Space Application Centre, ISRO, Ahmedabad
   Amount : 24.03 lakhs
   Role : PI

Duration: 3 years Project Objectives

- Evaluation of flood water characteristics (Load vs. Depth) -during flood progression and flood regression (temporal assessment).
- Assessment of flood inundation under urban clutter and vegetated area.
- Mapping pre-flood/during flood moisture zones to delineate possible flood route and evacuation sites.

Project Outcome

- The flood route and evacuation cite demarcation during flooding as well as flood water depth with sediment load characteristics assessment would help in flood hazards assessment and its mitigation using microwave data.

2. Quantifying Climatic and Non-climatic Drivers of Large-scale Ecosystem Change during 1982-2015 over India

Funding Agency : SERB, DST
Amount : 16.56 lakhs
Role : PI
Duration : 3 years

Project Objectives

- To analyze the key climate factors and non-climate driving factors leading to change in long-term NDVI trends of vegetation (both interannual and intraseasonal) at different ecosystem levels covering the satellite period 1982–2015.
- To identifying the underlying mechanisms and processes driving the variation of foodgrains production and forest biomass production.
- Perform simulations with an improved version of the terrestrial biogeochemical model CASA-GFED3. The model will be useful to quantify carbon flux anomalies associated with large-scale ecosystem change.

Project Outcomes

- Variability in vegetation (both agriculture and forest) as indicated by NDVI based on available long-term time-series datasets.
- Identifying driving mechanisms of large scale ecosystem change.

Publication

- B.R. Parida* and A.K. Ranjan (2019). Wheat acreage mapping and yield prediction using Landsat 8–OLI satellite data: A case study in Sahibganj province, Jharkhand (India). *Remote Sens. in Earth Systems Sci.*, https://doi.org/10.1007/s41976-019-00015-9 [ISSN: 2520-8209]
- A.K. Ranjan and B.R. Parida* (2019). Paddy Acreage Mapping and Yield Prediction Using Sentinel-based Optical and SAR Data in Sahibganj district, Jharkhand (India). *Spatial Information Research*, 27(4), 399-410 https://doi.org/10.1007/s41324-019-00246-4. [ISSN: 2366-3294]
- Parida, B and A.K. Ranjan (2019). Up-scalıng Paddy yıeld at satellıte-footprınt scale usıng satellıte in Sahıbganj dıstrıct, Jharkhand. ISPRS-GEOGLAM-ISRS Int. workshop on 'Earth Observations (EO) for Agricultural Monitoring', 18-20 Feb. 2019, New Delhi, Indıa.
- B.R. Parida (2017). Climatic control of Vegetation Trend Shifts in Northwest and Central India. 38th ACRS conference, Oct, 2017, New Delhi.

3. Modeling terrestrial carbon dynamics using LUE-based model

Funding Agency : UGC, FRP
Amount : 6 lakhs
Role : Principal Investigator
Duration : 2 years (2018 to 2020)

Project Objectives

- To assess the spatio-temporal patterns of NPP of subtropical forests/agriculture in Himalayan regions, and to attain an in-depth understanding on seasonal carbon exchange dynamics using the LUE model–based approaches, wherein satellite-based data will be utilized.
- To investigate seasonal dynamics of NPP and NEE in relation to environmental and biophysical factors, and
- To quantify the strength of carbon uptake (sink/source) in response to climate and extreme events (e.g., drought, heat stress, wild fire).

Project Outcomes

- Forest density, forest types maps over coniferous forest in Himalayan regions covering the elevation of 500 to 3500 m.
- The spatio-temporal patterns of NPP over coniferous forest in Himalayan region using Carnegie-Ames-Stanford Approach CASA) model.
- The spatio-temporal patterns of NEE to understand the carbon strength.

School of Engineering & Technology

DEPARTMENT OF ENERGY ENGINEERING

Dr. S. K. Samdarshi

Designation : Professor
Mobile : 9431107270
E-mail : drsksamdarshi@rediffmail.com

Research Projects

1. **Centre of Excellence in Green and Efficient Energy Technology(CoE-GEET)**
   Funding Agency : MHRD, New Delhi
   Amount : Rs.250.00 Lakh
   Duration : 4.0+2.0 years(2014-2020)

Outcome/Objective

- Developed a number of photoactive nano-materials for solar energy conversion and environmental remediation technology as well as tools for performance determination of solar thermal systems
- Developed new architecture of new generation photovoltaics
- Development of efficient technology for waste to energy conversion is underway
- A number of materials for sensors for energy and environment applications have been synthesized.
- The centre has a number of sophisticated instruments such as Xray Diffractometer (XRD),UV-VIS-NIR spectrophotometer with DRS attachment, Thermogravimetric analysis-differential thermal analysis instrument(TGA-DTA). Material Studio software

2. **Establshment of Solar Radiation Resource Assessment Station at CUJ, Ranchi**
   Funding Agency : MNRE, New Delhi
   Amount : ~ Rs.35.00 Lakh
   Duration : 5 years(2014-2019)

Outcome/Objective

- Solar radiation and associated data of Ranchi has been collected and is continuing to work beyond the planned project period.

Dr. Devdas B. Lata

Designation : Associate Professor
Mobile : 9284795918, 9431382608
E-mail : devdaslata@yahoo.com
devdaslata@gmail.com

Research Projects

1. **Cold Storage cum Dehydration of Vegetables through Solar-Biomass Gas Hybrid System.**
   Funding Agency : Ministry Food Processing Industries, Govt. of India.
   Amount : Rs. 67,00,000
   Duration : 02 years (Completed)

Outcome/Objective

- Using solar and bio mass energy as a source of Heat Energy.
- Using Thermal Compressor by replacing conventional conventional system.
- Working on the principle of Vapor Adsorption principle.
- Using methanol and silica gel as working fluid in thermal compressor.

2. **Design and Development of Hydrogen assisted dual Fuel diesel Engine.**
   Funding Agency : Ministry of Industries, Govt. of Jharkhand.
   Amount : Rs. 10.00,000
   Duration : 03 years (Completed)

Outcome/Objective

- Concern over current crude oil supplies in addition to varying oil prices has resulted in the wide evaluation of substitution of alternative sources of fuel. With the increasing need to conserve fossil fuel and minimize toxic emissions much effort is being focused on the advancement of present combustion technology. This has inspired to explore and testing of several alternative fuels such as alcohol, gas viz. CNG, LPG, biogas, producer gas, and hydrogen, which have been studied extensively.

3. **Design and Development of Bio-gas assisted dual Fuel diesel Engine for Rural Electrification**
   Funding Agency : Jharkhand Council of Science and Technology, Govt. of Jharkhand.
   Amount : 05,00,000
   Duration : 02 years (On going)

Outcome/Objective

- In comparison to other alternative sources of energy particularly in rural areas, producer gas from biomass appears to have the greatest potential. As an agricultural country, India has large variety of biomass feedstock available in huge quantity. As these are available locally, biomass gasifier-based power generation may be an appropriate option for decentralized power generation in many parts of the country. It is estimated that about 40%e60% of agricultural residues are either lost or put in to inefficient use. In the current context of scarcity of petroleum fuels, this recognizes for better utilization of these resources by thermo-chemically converting into bio gas.

4. **Development of Preservation Technique for local Musroom Rugra.**
   Funding Agency : Jharkhand Council of Science and Technology, Govt. of Jharkhand.
   Amount : 05,00,000
   Duration : 02 years (On going)

Dr. Basudev Pradhan

Designation : Assistant Professor
Department : Energy Engineering
Mobile : 8084510108
E-mail : basudev.pradhan@cuj.ac.in

Research Projects

1. **Development of High-Efficiency Organic Photovoltaic Devices**
   Funding Agency : Ramanujan Fellowship-DST
   Amount : 87,40,000/-
   Duration : 2013-2018

2. **Development of Highly Efficient Hybrid Solar Cells**
   Funding Agency : UGC start up grant
   Amount : 6,00,000/-
   Duration : 2014-2016

3. **Development of highly efficient inverted organic solar cells**
   Funding Agency : DST, SERB
   Amount : 23,00,000/-
   Duration : 2014-2017

4. **Investigation of Compositional Engineering for Efficient Perovskite Solar Cells (Co-PI)**
   Funding Agency : DST-CERI
   Amount : 99,64,200/-
   Duration : 2016-2019

5. **Centre of Excellence (CoE) in Green & Efficient Energy Technology (GEET) (with other 4 faculty members)**
   Funding Agency : MHRD
   Amount : 2,50,00,000/-
   Duration : 2014-2020

Dr. Sachin Kumar

Designation : Assistant Professor
Mobile : 7004788789, 9821564981
E-mail : sachin.kumar.01@cuj.ac.in
sachin044@gmail.com

Research Projects

1. **Production of the liquid fuel from mixed waste plastics by thermal and catalytic pyrolysis**
Funding Agency : UGC Startup Grant, New Delhi
Amount : Rs. 6 Lakhs
Duration : 2015-2017

Outcome/Objective

- Waste plastics are available in abundant in every part of the world which can be processed through pyrolysis and catalytic methods and can be further converted into liquid fuels which can be utilized later. The main objective of this study is to convert the five components of mixed plastics such as PP, LDPE, HDPE, PET and PS into oil/wax product for use as hydrocarbon fuel oil or chemical feedstock. The experimental setup has been established to study and compare the efficiency of blends of different kinds of plastic waste in certain fixed ratios.
- Publications: 1). Production of liquid fuel from mixed waste plastics through thermal pyrolysis, National Seminar on Reaching the Unreached Through Science and Technology, KIIT Bhubaneswar.
- 2). Conversion of mixed waste plastics into liquid fuel- An alternative approach for solid waste minimization, International Conference CEAEGS-2016, JNU New Delhi

2. **Centre of Excellence-Green and Efficient Energy Technology**
Funding Agency : MHRD New Delhi
Amount : Rs. 250 Lakhs
Duration : 2014-2020

- Outcome/Objective: Pyrolysis is known to be an environmentally friendly method because no wastes are produced during the process. Thermal pyrolysis of waste plastics can be improved by using suitable catalysts in order to obtain valuable products. The most common catalysts used in this process are: zeolite, alumina, silica–alumina, FCC catalyst, reforming catalyst. Recent work is going on the development of nano catalysts for increase in liquid yield from waste plastics and biomass. A novel catalyst can be developed with the collaboration and with the required instruments in the proposed centre for excellence.
- Publications: 1). Siba Shankar Sethi, Achyut K. Panda, Sachin Kumar, R. K. Singh, 'Valorization of Jatropha seed to fuel and chemical feedstock using a thermochemical conversion process' Biofuels (2016) 7 (5), 429-435.

DEPARTMENT OF NANOSCIENCE AND TECHNOLOGY

Dr. Gajendra Prasad Singh

Designation : Associate Professor
Mobile : 9470966245
E-mail : gpsinghcuj@gmail.com

Research Projects

1. **Synthesis and Characterization of Electromagnetic Wave Absorption Properties of Ferrite based Nanocomposites for High Speed Communication Applications**
   Funding Agency : SERB (DST)
   Amount : 16.44 lakh
   Duration : 2013-2017

Outcome

- Graphene supported Fe3O4 nanoparticles in oval shape structure was developed. The nanoparticles shows very low dielectric loss of about 0.02 with low dispersion loss.

1. **Mass scale Graphene Production and Synthesis of Various Types Nanomaterials (Under Boyscast Scheme)**
   Funding Agency : DST, New Delhi
   Amount : 23 lakh
   Duration : 2012-13

Outcome

- Technology for the mass production of seven gram Graphene in 40 ms was developed.

Dr. Arnab S. Bhattacharyya

Designation : Assistant Professor
Mobile : 07870674251, 07870674251
E-mail : arnab.bhattacharya@cuj.ac.in

Research Projects

1. **Plasma Surface Modifications of bismaleimide coatings deposited on aluminium sheets**
   Funding Agency : SERB (DST)
   Amount : 7.1 Lacs
   Duration : 3 years

Outcome/Objective

- Bismaleimide (BMI) coatings will be deposited on aluminium sheets by sprinkling Homide 250 BMI powders and putting the samples in oven. Plasma surface modification of the polymer coatings will be carried out in oxygen and nitrogen atmosphere. The physicochemical changes of surface of the polymer before and after plasma modification will be thoroughly studied. Aluminum was deposited on these BMI coatings by vacuum thermal deposition to make Al/BMI/Al and Al/BMI/MS trilayer which can solve the problem of accumulation of space-charge in aircraft bodies at high altitude.
- Publication in High Performance Polymer (Journal) 2016.
- M.Tech Thesis

2. **Centre of Excellence in Green and Efficient Energy Technology (CoE GEET)**
   Funding Agency : MHRD
   Amount : 2.5 Cr.
   Duration : 5 years

Outcome/Objective

- To focus on new and emerging technologies, multidisciplinary and translational research relevant to national development goals. To trigger an R&D culture in the institution as evidenced by significant increase in applications of research outputs, collaborative and sponsored research, publications, patents, innovations, commercialized products and Masters and PhD enrolments.
- The CoE-GEET is working on development of photoactive nanomaterials for solar energy conversion and environmental remediation technology; new Generation Photovoltaics; technology for waste to energy and sensors for Energy and Environment Applications

Dr. Ramesh Oraon

Designation : Assistant Professor
Mobile : **08757503912**
E-mail : ramesh.oraon@cuj.ac.in

Research Projects

1. **"Development of Self-assembled hierarchical porous nanostructured carbonaceous/metal oxide/conducting polymer based hybrid electrode materials and their electrochemical study"**
   Funding Agency : DST SERB (EEQ)
   Amount : 42.66 Lakh
   Duration : 3 Years

Outcome/Objective

- Designing, fabrication and physical characterization of self-assembled hierarchical porous nanostructured hybrid electrode material
- To explore the possibility of using these hierarchical hybrid material for real time application by developing binder free and flexible device

2. **"Development and electrochemical study of organic-inorganic based hybrid electrode materials: Towards Supercapacitor and Sensing application"**
   Funding Agency : UGC Start up grant
   Amount : 10 Lakh
   Duration : 3 Years

Outcome/Objective

- Development of organic-inorganic based electrode material and their characterization
- Real time application of these electrode material for energy storage and sensing application of chemical compounds

School for the Study of Culture

DEPARTMENT OF TRIBAL STUDIES

Dr. Rabindranath Sarma

Designation : Associate Professor
Mobile : 7549198583
E-mail : rabindranath.sarma@cuj.ac.in

Research Project

1. **Ethnographic Studies of PVTGs of Jharkhand: Asur, Birhor, Birjia, Korwa, Parhya, Mal Paharias, Sauria Paharia and Savar**
   Position : Co Principal Investigator
   Funding Agency : Ministry of Tribal Affairs, Government of India (through Tribal Research Institute, Government of Jharkhand)
   Amount : Rs. 40,00,000/-
   Duration : 2019-21 (2 Years)

Objective

- To study the social, cultural and physical folk-life, demography, habitation, education, health and living condition, communication traditions, folklore material and digitization of Particularly Vulnerable Tribal Groups of Jharkhand (Asur, Birhor, Birjia, Korwa, Parhya, Mal Paharias, Sauria Paharia and Savar).

2. **A Study about the Empowerment through Mobile Phones among Oraons of Jharkhand**
   Co-Project Director : Dr. Rabindranath Sarma
   Project Director : Dr. Dev Vrat Singh
   Funding Agency : Indian Council for Social Science Research (ICSSR)
   Amount : Rs 6,50,000/-
   Duration : Two Years

Dr. M. Ramakrishnan

Designation : Assistant Professor
Mobile : 9199140340 / 9444868577
E-mail : ilakkiyameen@gmail.com

Research Projects

1. **The Epistemological Foundations of Cultural Models of Ancient Tamil Society : Semiotic and Cognitive Explorations of Pazhamozhi Naanuuru**
   Funding Agency : Central Institute of Classical Tamil, Chennai
   Amount : 2.45 Lakh
   Duration : One year (2015-2016)

Outcome/Objective

- The objectives of this study: To understand the role of proverbs in the formation of cultural models that play a constructive role in shaping the behaviour of the community members. To understand the role of metaphor and metonymy in the cognitive tasks of people with the help of models proposed by George Lakoff and Mark Johnson. To explore the semiotic aspect of cultural experience and also to employ semiotic interpretation to each of the concept and their narrative association. To explore the semiotic aspect of cultural experience and to give semiotic interpretation to some of the concepts found in the Pazhamozhi Naanuuru.
- Manuscript will be published very soon.

2. **Life, Lore and Identity: Study of Identity Formation through Folklore of Oraon Community in Jharkhand**
   Funding Agency : UGC
   Amount : Full Salary with 2 Lakh Contingent +

2 years duty leave
Duration : Two years

Outcome/Objective (Max 100 words)

- The objective of the study is to understand the role of role in the identity formation of the Oraon community in Jharkhand. This study highlights the point that the folklore has a significant role to play in the community life of the indigenous communities for fulfilling their varied objectives. The cultural life of the Oraon community expressed through their rich folklore materials can be understood to have different objectives other than one set by the actual functions of the folklore in a natural context. The folklore items manifested in the natural contexts as well as in their induced natural context have been put in the use for fulfilling the aspirations of the community time to time.
- A manuscript will be published soon

Dr. Sujit Kumar Choudhary

Designation : Assistant Professor of Sociology
Mobile : 7004505381
E-mail : sujitjnu@gmail.com, sujit.choudhary@cuj.ac.in

Research Projects

1. **Impact of Provisions of RTE on Educational Status of Tribals of Jharkhand: A Comparative Study of Eight Villages of Ranchi and Dumka Districts**
   Funding Agency : University Grants Commission, New Delhi
   Amount : Approx. 20 Lakh (Salary+Research Grants)
   Duration : December 1, 2016-November 30, 2018 (2 Years)

Outcome/Objective

- The Research has discussed the implementation of key indicators of the RTE Act in the Government schools of eight villages of Ranchi and Dumka districts of Jharkhand state. This is comparative study of these districts and it finds very unsatisfactory implementation/output of the Act.

School of Mass Communication & Media Technologies

DEPARTMENT OF MASS COMMUNICATION

Dr. Dev Vrat Singh

Designation : Associate Professor
Mobile : 931960785
E-mail : vrat.dev@gmail.com

Research Project

1. **A Study about the Empowerment through Mobile Phones among Oraons of Jharkhand**
   Project Director : Dr. Dev Vrat Singh
   Co-Project Director : Dr. Rabindranath Sarma
   Funding Agency : Indian Council for Social Science Research (ICSSR)
   Amount : Rs 6,50,000/-
   Duration : Two Years

Outcome/Objective:

- Empowerment of individuals and community means greater control over life, increased options in decision-making and enhanced capacity/ skills to cope with challenges and optimizing their life. New information technology has provided greater opportunity to the isolated and marginalized population to express, participate and connect to the networked society. The *Oraons* are the second largest tribal population in Jharkhand. How far mobile phone has empowered them in socio-cultural, political and economic context is a question yet to be answered. The main objective of this study is to find out how mobile phone is contributing to the empowerment of *Oraon* community as whole and family and individual in particular.
- A survey through interview schedule along with focus group is carried out among 800 mobile users with equal gender representation in 40 villages of four districts in Jharkhand. Outcome of this research would help understand about the ways and means of digital empowerment of marginalized tribal community living in socio-economic backwardness and information poverty.

School of Management Sciences

DEPARTMENT OF BUSINESS ADMINISTRATION

Dr. Sanhita Sucharita

Designation : Assistant Professor (Economics)
Mobile : 9337172355
E-mail : sanhita.sucharita@gmail.com

Research Projects

1. **Causes and Impact of Labour Migration: A study of Jharkhand**
   Funding Agency : ICSSR
   Amount : 10Lakh
   Duration : 2 year and six month

Outcome/Objective

- To analyse the socio-economic determinant of seasonal migration.
- To presents a broad picture of who migrates, by structural factor such as, age, gender, class and ethnicity.
- To analyse the migrants working condition at the destination place in terms of provision of basic entitlements including access to subsidized food, housing, drinking water, sanitation, public health facilities, education, banking services, social security and legal protection.
- To examine the impact of seasonal migration on income, consumption pattern and on house hold assets.
- To analyse the impact of Government new social protection scheme (Mahatma Gandhi National Rural Employment Guarantee Act and National Rural Livelihood Mission) and food security programme on migration.
- To explore the role of Government in the process of migration.

Outcome

- The empirical findings suggest that the poverty, lack of sufficient means of subsistence, unequal distribution of land holding, to meet household expenditure, availability of employment opportunities at destination and loan are the major reasons for temporary migration of labour. The migrants are predominantly young men as they are often marginal farmer or landless, a situation that partly compels them to migrate looking for wage employment to earn additional income. Temporary migrants mainly comprising of ones who are from the socially and economically deprived backgrounds. These findings indicate that poor households are involved in temporary labour migration, however, some minimal threshold of resources may be required to participate in and leverage the benefits from these labour movements. Children accompanying their migrant parents for seasonal employment are the most “at risk” group of all in terms of educational vulnerability and capability formation. They are deprived of basic education and therefore become bonded to the low-skill–low-wage trap that their parents are currently in. Proper understanding of the magnitude and severity of the problem and suggesting innovative policies for breaking this vicious cycle is of utmost importance.

School of Languages

DEPARTMENT OF HINDI

Dr. Ratnesh Vishvaksen

Designation : Associate Professor
Mobile : 7004649048, 9162938857
E-mail : ratnesh.sen@cuj.ac.in

Research Projects

1. विद्यानिवास मिश्र के निबंधों का सामाजिक, सांस्कृतिक वैशिष्ठय
   Funding Agency : UGC
   Amount : 1.27 LAC
   Duration : 28.1.11 to 28.7.12

Outcome/Objective

- भारत अपनी समृद्ध सांस्कृतिक विरासत के लिए विख्यात है। संस्कृति का संबंध जीवन पद्धति से हैं। ऐसे दौर में जब सभ्यताएँ संकट में है तो हमारी संस्कृति ही सभ्यताओं की संरक्षक है। विद्यानिवास मिश्र जी के निबंध इसी महान सांस्कृतिक विरासत का प्रतिबिम्ब हैं। मिश्र जी के निबंध सांस्कृतिक मूल्यों को सहेज कर रखे जाने के लिए प्रेरित करते हैं।

Acknowledgement

Entire CUJ Family

192_0619_ Annapurna Press & Process 0651-2331800
appranchi.1969@gmail.com