



GOVERNMENT OF ORISSA

**REPORT ON THE ACTIVITIES OF
SCIENCE & TECHNOLOGY DEPARTMENT
FOR THE YEAR, 2007-08**

SCIENCE & TECHNOLOGY DEPARTMENT

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1. INTRODUCTION:

The Science & Technology Department is the nodal Department for the promotion of the Science & Technology in the State. The manifold scientific and technological activities are carried out by different agencies like Orissa Renewable Energy Development Agency (OREDA), Orissa Remote Sensing Application Centre (ORSAC), Orissa Bigyan Academy (OBA), Pathani Samanta Planetarium (PSP), Institute of Mathematics & Applications (IMA) and Institute of Materials Science (IMS) working under the aegis of this Department with the following objectives:-

- i) To keep abreast of the latest developments in the field of Science & Technology and to take steps for dissemination of these among institutions like industries, research laboratories, Universities and among scientists and technologists.
- ii) To co-ordinate the R&D Programmes of different departments, industrial and research institutions and to ensure scientific and technical co-operation among these institutions and agencies.
- iii) To formulate and fund, research and application programmes in the field of science and technology,
- iv) To encourage, develop and extend the use of renewable sources of energy including energy plantations.
- v) To popularize Remote Sensing Technology and make effective use of it.
- vi) To popularize science and technology among students and the people so as to inculcate in them a scientific temper and attitude.
- vii) To Promote and popularize appropriate rural technologies.
- viii) Development of Library-*cum*- Documentation Centre for Science & Technology.
- ix) Science & Technology communication through awareness promotion, support to Institutions for Seminars/Workshops etc., development of Science Centres and administration of Pathani Samanta Planetarium.
- x) To conduct Science & Technology Entrepreneurship Development Programmes.
- xi) To undertake fundamental research in mathematics and its application.

- xii) To conduct basic and applied research in the frontier areas of Material Science & Engineering.

2. STATE COUNCIL ON SCIENCE & TECHNOLOGY

The State Council on Science & Technology functions as the highest policy making body for development of Science & Technology and oversees the implementation of the programmes undertaken in the field of Science and Technology in the State. The activities pertaining to various programmes / schemes undertaken during the year 2007-08 are briefly stated below:-

2.1 International Workshop on “MESOSCOPIC, NANOSCOPIC & MACROSCOPIC MATERIALS” (IWMNMM-2008).

State Council on Science & Technology, Orissa has organized a three day-International-Workshop on “MESOSCOPIC, NANOSCOPIC & MACROSCOPIC MATERIALS” (IWMNMM-2008) with the collaboration of Institute of Materials Science from 2-4 January, 2008 at NALCO Guest House, Bhubaneswar. Different dignitaries of International importance had attended the workshop. The objective of this workshop was to focus on understanding of the basic Physics and Chemistry underlying the Mesoscopic, Nanoscopic & Macroscopic Materials Systems and their formation, self assembly, confinement, characterization and their spectacular electronic, optical magnetic, mechanical and transport properties were the focus of the workshop. The workshop has provided unique opportunities for the participants to interact with these scientists with the aim to obtain deeper understanding of the subject and to promote and establish long standing National & International collaboration.

2.2 National Symposium on Sustainable Pest Management for safer environment.

State Council on Science & Technology has provided partial financial support to organize a National Symposium on “Sustainable Pest Management for safer environment” organized by the Society for Plant Protection and Environment, Deptt. of Entomology, College of Agriculture, OUAT, Bhubaneswar from 6th to 7th December, 2007. The Symposium is mainly focused on to avert willful application of pesticides and ensure environmental safety through adoption of systematic and amicable methods of crop protection technology.

2.3 National Symposium on “Challenges in Improving Reproductive efficiency of farm and pet Animals”.

The State Council on Science & Technology, Orissa has actively supported the Indian Society for study of Animal Reproduction, Deptt. Of Gynaecology, Orissa Veterinary College, Bhubaneswar to organize a National Symposium on “Challenges in Improving Reproductive efficiency of farm and pet Animals” from 7th to 9th December, 2007 at Bhubaneswar with an objective of sustainable production through proper management, diagnosis, treatment and control measures of reproductive disorders.

2.4 UNESCO- Kalinga Prize

The Kalinga Prize initiated by Late Biju Pattnaik has been renamed as UNESCO-Kalinga Prize for Popularization of Science. The prize money for the purpose is enhanced to 20,000 pounds which will include the prize money of 10,000 pounds, cost of prize giving ceremony, publication of activities, and cost of Secretarial Assistance etc. It is decided to award the prize on Biennial basis instead of annually. The Department of Science & Technology, in the Ministry of Science & Technology, Government of India will bear the cost of 5,000 US Dollar for Biju Pattnaik chair and meet the expenses of Traveling of UNESCO-Kalinga Prize Winner from his country to India and his stay in India for three weeks to attend different seminars in different cities of India.

Other Activities of State Council on Science & Technology.

2.5 Establishment of Sub-Regional Science Center at Nrusinghnath, Baragarh District.

The State Council on Science & Technology is taking active steps for establishment of Sub-Regional Science Center at Nrusinghnath, Baragarh District to develop scientific temper among the people specially students and young mass of Western Orissa as well as neighboring States.

2.6 Science Quiz Programme

The State Council on Science & Technology, Orissa has proposed to conduct the State Level Monthly Science Quiz among High School Students to enhance the scientific temper and development of interest in Science related matters primarily focusing on areas of scientific activities being implemented by different Departments, State Undertakings and Agencies under the aegis of State Government with the nomenclature “**Jana-Ajana-Gyana- Bigyan**”.

2.7 Scholarship at Post Graduate Level on Basic Sciences

To motivate the meritorious students of Basic Science in streams like Physics, Chemistry, Mathematics, Botany, Zoology and Geology, the State Council on Science & Technology, Orissa has proposed to institute scholarship @ Rs.2,000/-per month for 25-students at PG Level.

2.8 Travel Grant

The State Council on Science & Technology, Orissa has been providing partial financial support to the Scientists of the State for attending National /International Conference / Field visit /training etc.

2.9 Renovation of Conference Hall of Science & Technology Department.

The Conference Hall of Science & Technology Department is to be renovated with the financial support from the State Council on Science & Technology.

2. DEVELOPMENT OF BIOTECHNOLOGY

Biotechnology is a frontier area of technology with immense benefits to society in diverse areas such as Food Security, Nutritional Supplementation, Health Care Productions and Industrial Applications. Considering the diversified resources of the State, this cutting edge technology has a potential to make a significant contribution to the economy of the State.

- ◆ A Biotech Pharma IT Park in phase-I is being developed at Mouza Andharua under Bhubaneswar Tahasil over an area of about 64.860 acres on a Public Private Partnership Mode. Land alienation in favour of IDCO is in process.
- ◆ The Biotech Pharma IT Park at Phase-II will be developed at Deras Agriculture Farm over an area at about 200 acres. In Phase-II, a Biotechnology based Industry Corridor will be developed. Alienation of 200 areas of land at Deras Agriculture Farm, the Development of the Biotech Pharma IT Park is in process.
- ◆ A Biotechnology Incubation Centre (BTIC) will come up over 10 acres in the premises of the Andharua Biotech Pharma IT Park. The work plan for setting up of the Biotechnology Incubation Centre has been sent to the Department of Biotechnology, Government of India, New Delhi for sanction of instrumentation for the BTIC.
- ◆ A team of experts on R & D. Projects Sub-committee visited the North Orissa University, Baripada on 1.4.2007 and Orissa University of Agriculture & Technology, Bhubaneswar and Medicinal Garden, Patrapada, Bhubaneswar on 2.4.2007 to review the projects funded by Science & Technology Department under the scheme 'Development of Biotechnology'.
- ◆ A draft Biotechnology Policy is in process for its finalization.
- ◆ The Request For Qualification (RFQ) for selection of Private Developer for development of the Biotech Pharma IT Park has been finalized.
- ◆ Request For Proposal (RFP) for selection of Private Developer for development of Biotech Pharma IT Park is in process for its finalization.
- ◆ A Quarterly News Letter under the title 'Biotechnology in the State at a glance' is being brought out.
- ◆ 'Team Orissa' led by Science & Technology Department Biotechnology Cell participated in the Banagalore Bio-2007 event held from 7th to 9th June 2007 at Bangalore and was awarded the first prize for best presentation and best content.

- ◆ Hon'ble Minister of State, Science & Technology (Ind. Charge) & Panchayatiraj Orissa has inaugurated the 'Agroshadenet House' of the project "Evaluation of germplasm and In-vitro Cloning of Gerbera & "Green House" of the Project "Collection and Evaluation of Rose Cultivars" funded by the Science & Technology Department (Biotechnology Cell) at the Orissa University of Agriculture & Technology Campus, Bhubaneswar on 03.01.2008 at 10.00 A.M.
- ◆ The Sub-committee for R & D. in its meeting held on 18.1.2008 under the Chairmanship of Director, Biotechnology & *Ex-officio* Additional Secretary to Government, S & T. Department has recommended for funding for new R & D proposals pertaining to Biotechnology for the year 2008-09 and second year release of funds for ongoing projects.

3. **ORISSA RENEWABLE ENERGY DEVELOPMENT AGENCY**

Orissa Renewable Energy Development Agency (OREDA) under the Department of Science & Technology, Government of Orissa is a Society constituted under Societies Registration Act-1860. The main objectives of the agency are:

- (i) to encourage the development and accelerated utilization of renewable energy sources wherever they are technically and economically viable.
- (ii) to improve the access and availability of renewable decentralized sources of energy particularly for the rural population;
- (iii) to contribute towards balanced rural and urban development as well as development of backward, hilly and tribal areas by enabling the use of locally available decentralized renewable energy sources and to create gainful employment opportunity with due importance for ensuring greater access to woman and other disadvantage groups to employment opportunities,
- (iv) to reduce environmental degradation resulting from deforestation.

The important activities undertaken by the Agency during 2007-08 are outlined hereunder:

◆ **Remote Village Electrification Programme (RVEP)**

Target has been fixed for electrification of 300 remote census villages in the State under 2007-08 programme. 58 villages have so far been identified and recommended by the Department of Energy, Government of Orissa for electrification through non-conventional sources of energy. OREDA has prepared project report for those 58 villages and submitted to Ministry of New and Renewable Energy, Government of India for sanction. The sanction of Government of India is awaited.

◆ **Small & Mini Micro Hydro Projects**

The defunct 20 KW MHP at Badaghagra has been revived and made functional. A 110 KW capacity MHP at Sunei in the district of Mayurbhanj has been renovated and trial run has been completed. The project is in operation from 14.09.2007.

◆ **National Biogas and Manure Management Programme (NBMMP):**

The National Biogas and Manure Management Programme (NBMMP) is a high priority Central Sector Scheme and a part of the 20-Point Programme. It can be used for cooking and lighting purposes. It also provides rich organic manure. During the year 2007-08, a target of 4000 biogas plants were allotted for Orissa by MNRE, Govt. of India against the above target, 186 nos. biogas plants have been completed. In the financial year 2008-09, steps are being taken to achieve 8000 nos. of biogas plants.

◆ **Wind Energy**

Orissa has Wind Power potential of 1700 MW. Six potential sites have been identified in the State for harnessing this power. To begin with 2-MW demonstration .Wind Power Project is being set up at Damanjodi in Koraput district to demonstrate techno-commercial feasibility of such Project with a view to attract private investment in the Sector. OREDA has already sent project proposal to MNRE, Govt. of India on the basis of report submitted by ITCOT Chennai for setting up of 2 MW Wind Power Project at Damanjodi. For setting up this project, proposal has also been sent to MNRE for approval.

◆ **Solid Waste Management**

OREDA has been appointed as Business Development Associate by H & U.D. Department, Government of Orissa for setting up of Municipal Solid Waste (MSW) based power project in the State. Expeditious steps are being taken to the project assist the H & U.D. Department to ground WTE Project for the twin cities of Cuttack and Bhubaneswar including other 15 Municipalities in the State.

◆ **Battery Operated Vehicle:**

OREDA has successfully launched operation of two 10-seated battery operated three-wheeler vehicles at Nandankanan Zoological Park for Zoo rides which is silent and non-pollutant. The vehicle is in operation and attracts tourists. In the financial year 2007-08, revenue is being generating from the vehicle.

◆ **Electrification through Bio-fuel**

OREDA has successfully demonstrated the application of Straight Vegetable Oil for power generation in remote villages by setting up a 3.5 KW Power generating system run on Karanj Oil in Dangabhuin Village of Ganjam District. Before recommending this as a new technology for remote village electrification, it is proposed to replicate such projects in 10 villages in different regions of the State. Setting up of each project on an average costs about Rs.7.00 lakh.

◆ **Bio-Diesel Programme**

For assessment of the potential of production of Bio-diesel from different locally available non-edible vegetable oils, OREDA has set up a 75 liter / batch capacity Bio-diesel unit in its premises along with a laboratory for conducting various experiments in this regard. In course of these experiments, the procedure for production of Bio-diesel from different kinds of oil-seeds will be established. OREDA has signed an agreement with the DFO, Ghumsur Division for supply of non-edible oil seeds. With regard to Bio-diesel programme a Workshop was organized on 5-2-07 at Bhubaneswar. The Jatropha Plantation and Bio-diesel production will be intensified during 2008-09 and extended to all districts of the State.

◆ **Renewable Energy Policy**

It is the Policy guidelines on matters relating to promotional and fiscal incentives for power generation from Non-Conventional Energy Sources in the State. The main objectives of the Policy are to reduce dependency on conventional sources of power generation. Other objectives are,-

- (i) Protecting the environment,
- (ii) generation of employment on a large scale,
- (iii) generation of grid quality power from NRSE so as to reduce dependence on conventional sources of power,
- (iv) encourage entrepreneurial investment in NRSE,
- (v) provide such rational fiscal and promotional incentives so as to provide conducive atmosphere to attract private investment.

◆ **Awareness Generation, Publicity & Exhibition during the year 2007-08**

Under electronic media, 3 nos. of video films under Bio-Energy & Solar Energy Programmes prepared earlier were telecasted from time to time in Interactive Training Programme under Gram-sat Pilot Project being organized by ORSAC authorities for the State of Orissa. The Interactive Training Programme under Gram-sat network is being done regularly in each month on Renewable Energy Programmes by this Agency. The Radio jingles

prepared on NBMMP Programme in Sambalpuri dialect have been broadcasted from Sambalpur and Bhawanipatna Stations and in Cuttaki dialect from Cuttack and Jeypore in their rural Programme from 06.03.07 for a period of 30 days. Further, a newly produced jingle in renewable energy has also been broadcasted for a period of 30 days from 08-03-07 in the State News of prime time of All India Radio, Cuttack.

OREDA has also been enthusiastically participating in several different Melas / Festivals in different important festive occasions of Orissa by organizing NRSE Exhibitions for popularization of NRSE devices as well as well as programmes.

To create awareness on use of renewable energy, the Mobile Exhibition Van has also been sent to different places of Orissa as demonstration unit. In order to create mass awareness / publicity on renewable energy in the State, 15 nos. orientation and awareness camps under information & Public Awareness Programme were organized in the capital city of Orissa as well as in 11 districts.

Under Print Media, advertisements (both classified & displayed) in colour and black & white in different news papers (both National & Regional), magazines, souvenirs, journals in English and regional languages have been issued for wide publicity. Printing of booklets / folders / brochures on different renewable energy programmes in English language have been prepared and used in conferences / seminars / workshops being organized by this Agency from time to time. Further, brochures / leaflets prepared on renewable energy programmes have been distributed to the visitors coming to OREDA and during exhibitions.

The Rajiv Gandhi Akshaya Urja Diwas was celebrated as Renewable Energy Day on 20-20-8-07 in the State Capital of Orissa followed by a Mass Rally / Run, Exhibition women football match, arranging different competitions among the students and panel discussions on renewable energy programme in Regional Kendra of Doordarshan, Bhubaneswar and seminar on the occasion. Besides, district level celebrations were also organized by the district administration to mark the day on the occasion. The silver Jubilee foundation day of the Ministry of New and Renewable Energy, Government of India was also observed in the State Capital on 06-09-2007 followed with one-act plays on renewable energy programme performed by the selective school students on this occasion.

Two numbers of hoardings of 200 Sqft. sizes each have been set up inside the Biju Pattnaik Energy Park at Khandagiri, Bhubaneswar and main bus stand of Bhubaneswar to attract the visitors for visiting the park in a large scale.

Besides, action has been taken to install two numbers of bus stop shelters in Cuttack & Puri to attract the people at large. Further, 10 nos. of bus back panels have been fixed in those commuting to the rural areas by touching different head quarters of the State such as Balasore, Bolangir, Cuttack, Dhenkanal, Ganjam, Keonjhar, Puri, Mayurbhanj, Sambalpur and Sundargarh. 10 numbers of wall paintings have been fixed in rural areas of 10 districts of the State.

Workshops and seminars on renewable energy programme were organized on different dates for promotion and popularization of renewable energy programme in the State.

◆ **SPV Programme**

In the year 2007-08, OREDA has proposed to implement 100 nos.of Street Lighting Systems, 1000 nos. of Home Lighting Systems and 250 nos.of Solar Lanterns.

4. ORISSA REMOTE SENSING APPLICATION CENTRE

a) FASAL (Forecasting Agricultural output using space agrometeorology and Land based observations)

Four forecasts on acreage and production of kharif paddy, groundnut, jute and ragi has been made under this programme during August, September, October and November 2007. The paddy acreage has been estimated through the analysis of multi-date RADARSAT SAR data and yield forecast is based on agro-meteorological models. The results have been made available to the user departments of Central and State Govt.

b) Coastal Studies Project

Land use/ land cover mapping of coastal districts of Orissa is undertaken under the programme.

c) Natural Resource Census of Orissa State (NRC-LU/LC-50K)

Under this project, land utilization map and statistics are being developed for 30 districts of Orissa.

d) National Wasteland Monitoring Mission Project

Wasteland mapping of the state is undertaken under this project.

e) Road Network Database for Orissa

The road maps of all 30 districts of the state have been prepared and sent to district administration for ownership and surface status verification and validation.

f) Road GIS Database of Orissa (PMGSY)

The road maps of Jatani Block showing detailed information on administrative, infrastructure, Settlement locations, Water body / Drainage, Market and Tourist locations etc. have been prepared and sent to C-DAC, Pune for preparation of web enabled road GIS database.

g) Perspective Plan Preparation for BCUC Region (Bhubaneswar-Cuttack Urban Complex):

Remote Sensing and GIS based land use maps have been generated for Bhubaneswar Cuttack Urban Complex region for perspective plan preparation.

h) Comprehensive Development Plan Preparation

Mouza / Village wise digital cadastral datasets has been generated for all the 357 villages of BCUC Region. Plot level land use map of 302 villages / mouza has been completed.

i) NR Census Land Degradation Mapping Project

Land degradation mapping as per national level guideline is undertaken.

j) Codification of Administrative Units

Codification of all administrative units except RI has been completed. The village boundary datasets have been submitted to Survey of India for validation at their end.

k) Water body Database of Ganjam District

The water body database of Ganjam district has been prepared and handed over to UNDP.

l) Potential Fishing Zone Advisories Dissemination and Validation

The PFZ advisories received from INCOIS, Hyderabad have been disseminated to the users of coastal Orissa for guiding the fisherman community for more fish catch in the marine fishing sector.

m) Forest Working Plan Inputs preparation in Orissa using Remote Sensing and GIS

Forest Administrative, Management and Density maps have been generated for 12 Working Plan Divisions of the State and submitted to Forest Department.

n) Forest Land use / land cover mapping of Mayurbhanj Elephant Reserve

The digital layers on road, drainage, water body and the forest management boundaries of Mayurbhanj Elephant Reserve have been completed.

o) Preparation of Wildlife Habitat Management Maps of Project Impact Area of Rengali Irrigation project

Maps showing the existing and proposed forest administrative and management locations along with other resource maps of the Rengali Wildlife Habitat area have been prepared and submitted.

p) Pre-Irrigation Soil Survey in Irrigation Commands

Land use / land cover mapping for four irrigation commands has been completed. Physic-chemical analysis of soil samples collected for soil mapping has also been completed.

q) Environmental Impact Analysis of Bauxite Deposit Areas of Koraput and Rayagada districts

The land use / land cover maps of Koraput and Rayagada divisions have been prepared and submitted.

r) Livestock GIS Database Development for Animal Husbandry and Veterinary Service Department

The livestock GIS database generation for 23 districts of the state has been completed. Quality checking of the database has also been completed.

s) Monitoring of Water body of Cuttack city

Water body map of Cuttack city for the year 1990 (from Air photo) and 2007 (Cartosat data) have been prepared and submitted to the district administration.

t) DMS Project

The flood maps of Orissa during July and August 2007 indicating the villages inundated roads and culverts submerged etc. have been prepared and submitted to government for taking appropriate measures on flood relief.

u) GRAMSAT / EDUSAT Project

Development programmes on various Govt. departments have been transmitted from 5.30 PM to 7.15 PM except Sunday where transmission has been made from 3.00 PM to 7.15 PM to accommodate Oriya Feature Film. 105 Interactive Training Programmes have been conducted by the user Departments. EDUSAT hubs have been installed at ORSAC for educational broadcasting.

v) Training programmes conducted

(i) Decision Makers level training programme on Remote Sensing and GIS applications in Town and Country Planning – 26th to 28th February 2007.

(ii) Supervisory level training programme on Remote Sensing and GIS Applications in Town & Country Planning – 12th to 24th March 2007.

- (iii) Training programme on use aspect of GIS for Water Resources Department - 19th July to 1st August 2007
- (iv) Orientation Programme on Bigyan Prasar – 24th to 26th February 2007.
- (v) Decision makers level training programme on RS & GIS application in Town & Country Planning - 26th-28th December 2007.
- (vi) Training Workshop on Wetland Inventory and Assessment-28th , 29th January,2008

6. ORISSA BIGYAN ACADEMY

- (a) “Bigyan Diganta”, the monthly Science Magazine, specially designed for school students and for their parents and other rural people is being continuously published by the Orissa Bigyan Academy since 1993. During 2007-08, eleven issues of “Bigyan Diganta” have been released. The “Bigyan Diganta” has been distributed mainly to the High Schools of the Gram Panchayat headquarters of the State free of cost.
- (b) Orissa Bigyan Academy is also publishing an abridged version of “Bigyan Diganta” for visually handicapped students of the State. The magazine is brought out quarterly and distributed to the blind students and their institutions. During 2007-08, three issues of the abridged version of popular science magazine “Bigyan Diganta” have been printed in Braille Oriya script and released.
- © A workshop on science writing has been from 05.04.2007 to 08.04.2007 at Baripada in Mayurbhanj District. This programme was catalyzed and supported by Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad (RVPSP), Department of Science & Technology, Govt. of India, New Delhi. The purpose of the workshop was to improve the quality of popular science writing in the state and to create more and more popular science writers in the state which *inter alia* would improve the quality of articles in Oriya science magazines/newspapers/electronic media. Around 40 Science Teachers of Mayurbhanj District participated in the workshop. The Academy also invited two speakers (eminent science writers & journalist) daily for four days to deliver talk in the above workshop.
- (d) A workshop on science writing was on 04.11.2007 at Regional Science Centre, Bhubaneswar. The purpose of the workshop was to improve the quality of popular science writing in the state and also for monthly Science magazine “Bigyan Diganta” published by Orissa Bigyan Academy. The eminent popular science writers of Orissa attended the said Workshop and gave their views.
- (e) Orissa Bigyan Academy has organised the different popular science programmes viz. Science Exhibition, science based Essay/ Debate/ Quiz/ sit & draw competitions etc. among the school children in collaboration with different schools of the state.

THE SAMANT CHANDRA SEKHAR AWARDEES (OUTSIDE THE STATE CATEGORY)

PHYSICAL SCIENCES (Outside)

Dr. Karuna Kar Nanda
Asst. Professor, Materials Research Centre, Indian Institute of Science, Bangalore-560 012.

ORISSA YOUNG SCIENTIST AWARDEES

(i) PHYSICAL SCIENCES

Dr. Motahar Reza, Asst. Professor,
National Inst. of Science & Technology,
Parul, Hills, Berhampur-761 008, ORISSA

(ii) ENGINEERING AND TECHNOLOGY

Dr. Durga Prasad Mahapatra
Asst. Professor, Dept. of C.S.E.,
National Institute of Technology (NIT),
Rourkela - 759 008

POPULAR SCIENCE WRITERS AWARDEES

General Category

Professor (Dr.) Bipin Bihari Swain
Retd. Professor,
15, Chintamaniswar, Bhubaneswar
and

Professor (Dr.) Sasimani Panda
Retd. Professor, Friends Colony,

(Joint Awardees) Bajrakabati Road, Cuttack

Children Category

Professor (Dr.) Gadadhar Mishra
Retd. Professor, Professorpara, Cuttack

FELICITATION OF THE SENIOR SCIENTISTS OF THE STATE

1. Prof. S. P. Mishra, Emeritus Professor, Institute of Physics, Bhubaneswar & Ex-President, Orissa Bigyan Academy, Bhubaneswar
2. Prof. M. C. Dash, Ex-Vice Chancellor, Sambalpur University

HONOURING EMINENT SCIENTISTS POSTHUMOUSLY

- a) Late Prof. Dayanidhi Pattanayak,
Ex-Professor & Head, Dept. of Chemistry, Ravenshaw College, Cuttack.
- b) Late Professor (Dr.) Banshidhar Samantarai,
Ex-Vice Chancellor, OUAT, Bhubaneswar.
- c) Late Professor Mahendra Kumar Rout, Ex-Vice Chancellor, Utkal University,
Vanivihar, Bhubaneswar

7. PATHANI SAMANTA PLANETARIUM

Pathani Samanta Planetarium is the premier institute of the state for popularization of science in general, Astronomy, Astro-Physics and Space science in particular. Since its inception 1990 it has attracted about 1, 00,000 visitors every year.

The main objective and function of the Planetarium are to bring to the public the awe and wonders of the universe through the planetarium shows. It aims at creating awareness on astronomy, astrophysics and space science among the common mass in general and among the young students in particular. It serves as the key institution of the state in instilling scientific temper among the people. The various programmes undertaken during the year are outlined below:

I) Night Sky Watch Programme:

Inside PSP premises:

- i) No. of days – 24
- ii) No. of visitors – 2500

II) Audio Visual Programmes:

- i) No. of slide shows – 7
- ii) No. of popular talks-12

III) Planetarium Programmes:

Two planetarium programmes i.e. (a) Biswasambadhiya Dhakka (*Three shows in Oriya*) and (b) *Cosmic Collision (One in English)* have been conducted every day (except *Monday*). Planetarium presented shows of about 40 minutes on various astronomical topics for general public through out the year. During special shows for school students, normally a discussion and question- answer session is conducted on the contents of the programme. This year about 83,629 visitors watched the planetarium shows.

IV) Light, Sound & Water Programme

On 14th May, 2006 Hon'ble C.M. of Orissa S.J. Naeen Pattnaik inaugurated the Light, Sound and Water Programme and Astronomy Park in the premises of the Pathani Samanta Planetarium. The basic feature of this programme is based on use of (i) Laser Projector, (ii) Water Screen (iii) Intelligent Moving Head Projector and (iv) Eight Channel Audio Track. Musical fountain are the most attractive features of this programme. This programme is based on the Kalinga War and the *Emperor Kharavela*. During the year about 8100 visitors witnessed the Light, Sound and Water shows.

V) Astronomy Park:

In the premises of the Pathani Samanta Planetarium an Astronomy Park is established with some Indoor and out door models to include the scientific spirit, curiosity and quest in young minds. The park is designed to entertain through the process of “*Learning while Playing*”

The park enriched with some beautiful scientific models like PSLV Rocket, Horizontal Sundial, Equatorial Sundial, Vertical Sundial, Solar System, Jupiter, Mars, and their satellite, Swing as pendulum, See through the wall etc.

VI) Night Sky Watch Programme

Night sky watch programme was organized in the premises of PSP during every month after the new moon for three days. Visitors from different nooks and corners were thrilled to observe the celestial bodies with the naked eyes and through the telescopes. These telescopes are used frequently to conduct night sky watch programs at planetarium and out side planetarium. This programme is normally conducted from September to June every year when the sky is clear for observation. This programme is organized at different places of Orissa in collaboration with local bodies like schools, colleges etc.

VII) Life and Art work on Samanta Chandrasekhar

Life and Art work on Samanta Chandrasekhar has been established to educate the people of Orissa about extra ordinary talent of Samanta Chandra Sekhar on Astronomy.

VIII) SCAAA Progrmme

The Monthly meeting of SCAAA has been held regularly. Different popular science lectures were delivered by the eminent Scientist. More than 50 numbers of students and members of SCAAA attended in each meeting.

IX) Young Astronomers' Talent Search -2007 (YATS-2007)

Pathani Samanta Planetarium in collaboration with TATA Steel has organized ‘**A State Level Young Astronomer Talent Search-2007**’ with a view to popularize astronomy

and astrophysics among the students. The students from Class-VIII to IX participated in the workshop. A brief write up on Astronomy, Astrophysics and Space Science was submitted by the students and selected candidates were called for attending the zonal camps on their respective zones from 15th Nov, 07 to 28th Nov, 2007. About 500 students participated in the zonal camps in six various places of Orissa and 150 students were selected to participate in the State level YATS-2007 at Bhubaneswar from 12th Dec to 13th Dec, 2007. The models submitted by the students were evaluated by the eminent scientists and the best 10 models were suitably awarded by the Hon'ble Chief Minister, Orissa on the eve of the 173rd Anniversary of Mahamahapadhyaya Chandrasekhar Singhsamant Harichandan Mohapatra on 13th Dec, 2007.

X) Various science popularisation Programme

- a. On 26.05.2007 about 100, +2 students of ITER and Times visited planetarium and viewed the planetarium show. After the end of the show, a lecturer on Planetarium Programme and the Light, Sound and Water Programme of PSP was delivered to them.
- b. Sri Soumyashant Nayak of D.A.V School, Chandrasekharpur, Bhubaneswar and Sri Himalaya Senapati from Sunshine School, Bhadrak trained in astronomy in PSP. have been awarded with Gold and Silver in International Olympiad held at Thailand and Ukraine respectively.
- c. Five students of ICFAI University have joined in summer course for technical project work in Pathani Samanta Planetarium form 21.05.2007. The course was of two months' duration. The students were awarded with certificates after completion of their training successfully.
- d. Sri Himalaya Senapati, Sunshine School, Bhadrak has been selected to participate in Junior level International Astronomy Olympiad. He has been given the library facilities and idea for other celestial bodies from the staff of the Pathani Samanta Planetarium. Sri Soumyashanta Nayak, D.A.V. School, Chandrasekharpur, Bhubaneswar has been selected to participate in the senior level International Astronomy Olympiad.
- e. On 24.08.2007, with active support of the staff of the PSP a slide show and a Night Sky Watch Programme was organised on celebration of Science Exhibition at Saraswati Vidya Peeth, Badagada Brit Colony, Bhubaneswar. Director, PSP was invited as Chief Guest and delivered the lecture on various activities of Pathani Samanta Planetarium.
- f. On 8th Jan, 2008, the 18th Foundation Day of Pathani Samanta Planetarium was celebrated in the auditorium of PSP. Prof. S. Torasia, Ex-Director, PSP attended the function as Chief Guest. In this auspicious occasion, Pathani Samanta Planetarium awarded trophies to Sri Soumyashanta Nayak, D.A.V. School, Chandrasekharpur, Bhubaneswar and Sri Himalaya Senapati, Sunshine School, Bhadrak for their participation in international Astronomy Olympiad. Dy. Director, Pathani Samanta Planetarium, Bhubaneswar.

8. INSTITUTE OF MATERIALS SCIENCE

The primary aims and objectives of Institute of Materials Science (IMS) is to create suitable avenue and infrastructure to carry out basic as well as applied research in the frontier field of materials science and to conduct need-based multi-disciplinary research work on new value-added materials. The Research & Development activities of the Institute are stated below:

IMS has already started following two new in-house R & D programme based on the resources available in state.

Material Preparation:

Nano-powders of La-Ca-Mn-O, Ho ($x=0.03$ and 0.06) doped La-Ca-Mn-O samples, Y-Ba-Cu-O and Co-doped YBCO samples are prepared by pyrophoric technique using our (IMS) nano chamber facility as well as by conventional solid state sintering route. Mg and Ti doped Al-Zr samples of various compositions were prepared by solid-state reaction route to study the microstructure by Electron Probe Microstructure analysis. The Bulk pellets of La-Ca-Mn-O were sintered by thermal plasma using the plasma sintering facility of RRL-Bhubaneswar by varying plasma-sintering time from 2 minutes to 5 minutes.

With continuation to above sample preparation procedure, ZnO and LCMO thin films were prepared using our spray pyrolysis setup by changing various parameters like substrate temperature, distance between spray nozzle and the substrate as well as core temperature of the furnace and annealed at 800-900°C.

Experimental Characterization undertaken:

XPS experiments of Ti/Mg doped Al-Zr composites, Plasma sintered LCMO and Conventional sintered LCMO samples were done using the facility of Institute of Physics facility to know the metal constituent in the sample. With consideration to this EPMA experiments were carried out using the facility of RRL-Bhubaneswar to know the phase and distribution of grains in the sample. AFM experiments of 3 minutes plasma sintered La-Ca-Mn O sample was done in the institute during the demonstration given in the institute by INFUSIL demonstrators.

The four-probe experiment was done at Dept. of physics of Utkal University to get the resistivity versus temperature characteristics of Co-doped YBCO sample. XRD, SEM data of Sr based LCMO bulk materials were obtained from National Taiwan University, Taiwan. SQUID datas were also obtained from our collaborators of BARC.

Utilization of Coconut Waste for Production of activated and Pharma-grade Carbon:

IMS has already started preliminary research work for synthesis of activated carbon from coconut waste and bamboo using existing materials processing furnace. Attempt has been

taken for preparation of Pharma grade carbon from coconut waste using a clean transparent quartz tube furnace with controlled atmosphere. Microscopic analysis of samples were tested by PIXE and XPS studies and compared with the Pharma grade sample obtained from Moscow by Prof. S. N. Behera, Director, IMS. Only after achieving encouraging findings and results, a project proposal may be formulated for external funding to IMS.

It is proposed to set up a semi-pilot plant at Tarini Temple located at Ghatagaon, Keonjhar at the Govt. level with the existing technical know-how of DST, GOI which needs initiation. In this connection, Director, IMS has already contacted DST, GOI officers/Scientists, at a personal level.

Microscopic analysis of ores of different mines located in Orissa

Samples from NALCO and Orissa Mining Corporation were collected for preliminary analysis using PIXE facilities of IOP. Primary aim of this programme is to make a complete data base of Ores/ minerals available in Orissa. For this, it is planned to collect samples from different mines at different depths and zones. To start with, we have already started PIXE studies of a series of 14 numbers of mining samples received from the mining sites of Daitari, South Kaliapani, Sukrangi. More and more interaction with Mining Corporation and industries are required for which IMS need to develop to a strong R & D infrastructure with committed human resources. The institute acknowledge with thanks to the Principal Secretary, Department of Science & Technology, Govt. of Orissa for her initiative and involvement in procuring the samples of ores from the mining corporation of Orissa.

External projects undertaken

- i. Coconut waste management for production of activated carbon.
- ii. Microscopic analysis of Ores of Orissa for a complete database.
- iii. Synthesis of oxide films by spray pyrolysis.
- iv. Preparation of hole and electron doped ceramic CMR materials.
- v. Ultra fine powder preparation down to Nano scale dimension of LCMO powder by chemical route (pyrophoric method).
- vi. Plasma sintering of Al-Zr high temperatyre oxide ceramics and CMR manganites.
Study of magnetization in manganite system in presence of lattice distortion.

Theoretical studies completed and published during this period 2006- 2007

- i. Science & Technology of Nan materials
- ii. Band Jahn-Teller distortion and Superconducting excitations in Raman Spectra
- iii. Model study of Physical properties of Magnetite system
- iv. Electronics Properties of ordered and disordered linear clusters of atoms and molecules
- v. Model of Interplay of Band J-T Effect on Magnetic Order Mediated By Exchange Interaction
- vi. Effect of Jahn-teller distortion on the superconducting gap
- vii. “Some Recent development on Magnetism” in “Physics of Solids Nuclei and Particles”

Institute of Materials Science jointly with the Drexel University, Philadelphia, USA has organized an International workshop on Mesoscopic, Nanoscopic and Macroscopic materials (IWMNMM-2008) during 2-4th January 2008.

9. INSTITUTE OF MATHEMATICS & APPLICATION

a) Research Scholars.

Presently there are six research scholars in this Institute. Four research scholars are supported by the Govt. of Orissa, among which two are senior research scholars pursuing their research on “Wavelet and its Applications” and “Mathematical Finance” ,and the other two are JRF pursuing their research on “Analytical Number Theory” and “Fourier Analysis” . NBHM supports one senior research scholar (SRF) who is working on “Probability and Stochastic Processes”. CSIR also supports another research scholar, who is perusing his Ph.d on “Operator Theory” in this Institute.

Besides them some other research scholars are working in different related fields under the supervision of Prof. S.Pattanayak, Prof. G. Das, Prof. M.N. Mishra, Prof. P.C.Das and Dr.Shishir Kumar Sahoo.

b) Exchange programme.

The Institute of Mathematics and Applications has signed a memorandum of understanding with the Western Ontario University, Canada for exchange of researchers which include research fellows, undergraduate students and faculty.

An understanding has already been reached with the National Institute for Science Education and Research (NISER) to have joint lecture programmes to be supported by the NISER.

c) Organization of seminar and Conferences.

The Annual Conference of Orissa Mathematical Society has been organized by the Institute of Mathematics and Applications at Sailabala Womens' College, Cuttack from 2nd Feb'08 to 3rd Jan'08.

The Institute organized the 43rd Programme Advisory Committee-Mathematical Sciences meeting of the Dept. of Science & Technology, New Delhi under Ministry of Science & Technology (Govt. of India) held on the 30th and 31st July'07, in Bhubaneswar at Conference hall NALCO.

Institute has proposed to NBHM to organize a Workshop on Harmonic Analysis.

Regular Seminars are organized by the Institute, for benefit of the members of the Institute as well as students and faculty of the Educational Institute.

d) Courses offered

This Institute has started since the Academic year **2006-2007** with the following course programmes:

- ◆ B.Sc (Hons.) in Mathematics and Computing: This course is offered by the Institute to impart quality Mathematics Education at undergraduate level which shall equip students with a level of Mathematics to qualify in the entrance tests for them to pursue Ph.D in prestigious Institutions of India and abroad. *In the academic session 2006, eight students and in the academic session 2007, thirteen students have taken admission into this programme.*
- ◆ M.A / M.Sc in Computational Finance: This is a course first of its kind in India Utkal University accorded affiliation to this course. *In the academic session 2007-08, fifteen students have taken admission into this programme.*

e) Search and Nurture Programme of Mathematics Talents

- ◆ The Institute organized Rural Mathematics Training Camp of 2005 batch from 30th Jan'08 to 5^h Feb' 2008. at Sambalpur B.Ed College.
- ◆ 30 students selected through Regional Mathematics Olympiad held on Winter Mathematics Training Camp 03.12.2007 were trained in a camp organized by the Institute from 27.12.2007 to 31.12.2007.

- ◆ As a result of the Training camp for INMO held during 27.12.07 to 31.12.07 out of 30 students selected from All India Competition for Inter National Mathematical Olympiad three are from Orissa.
- ◆ Sunday morning class is a very popular programme offered freely by the Institute of Mathematics and Applications.
- ◆ A Prize Distribution Ceremony for Math Olympians-2006 was organized by the Institute of Mathematics and Applications on 13.06.2007 in the Auditorium of Institute of Physics. The Hon'ble Chief Minister of Orissa Sri Naveen Patnaik distributed Gold and Silver Medals and Prizes to the Students.
- ◆ The Institute will conduct a training programme for 80 selected school students and their guide teachers, 130 participants from 30th January'2008 to 5th Feb'2008 at B.Ed College, Sambalpur under RMTS programme.
- ◆ The Institute will conduct a Training Programme for 85 students and their guide teachers from 23.02.2008 in 29.02.2008 at Sri Aurobindo School, Sundargarh under RMTS Programme.
- ◆ The Koraput Project has been started from Jan-2008 to nurture the nonperforming schools in Koraput District.

f) Programme for SC/ST children

- ◆ The Mathematics training camp for SC/ST students of SSD School held from 18.07.2007 to 24.07.2007 in SC ST Research and Training Institute Bhubaneswar.
- ◆ The Institute has conducted a training programme for mathematics teachers of the SSD Schools in the premises of the S.C. /S.T. Training and Research Institute, CRP Square, Bhubaneswar between 10.05.2007 till 14.05.2007.

g) Infrastructure Development

- ◆ The TATA STEEL Pvt. Ltd. has inaugurated the Building construction of Institute of Mathematics and Applications on 28th Feb'2007. The construction work is in progress by the TATAs (TATA STEEL Pvt. Ltd.), rapidly and the TATAs agreed to commission it by the end of March'2008.

◆ **Library:**

The Institute now has a library with International Journals and advanced level books. This is the best reference library in mathematics in Orissa. This can even be deemed as the best library in Orissa, Chhattisgarh and Jharkhand.