



GOVERNMENT OF ODISHA

ANNUAL ACTIVITIES REPORT 2017-18

**SCIENCE & TECHNOLOGY
DEPARTMENT**

1. Introduction

The Science & Technology Department is the nodal Department for the promotion of Science & Technology in the State. The Department implements various activities and programme through organizations such as Odisha State Council on Science & Technology (OSCOST), Odisha Renewable Energy Development Agency (OREDA), Odisha Space Application Centre (ORSAC), Odisha Bigyan Academy (OBA), Pathani Samanta Planetarium (PSP), Institute of Mathematics & Applications (IM&A) and Institute of Material Science (IMS).

2. Objectives:

- To popularize Science and Technology among the people in general and the student community in particular of our State so as to inculcate in them a Scientific temper and attitude.
- To pursue teaching programme in higher mathematics, research and its application and to search and nurture talents in mathematics.
- To facilitate research in the frontier areas of material science and to conduct inter disciplinary research on special materials, their development, production and utilization.
- To provide financial support to pursue masters and Ph.D programmes in basic and applied science; “to promote research in Basic and Applied science; to organize seminars/ workshops of international, national and State levels, to encourage participation in the international and national conferences.
- To provide support for biotechnology teaching, research and investment in the State.
- To propagate, develop and extend the use of renewable energy sources, devices in the State.
- To promote and popularize integrated use of space and information technologies by various departments for better planning and implementation and monitoring of various development programme effectively.

- To create awareness among the people in Astronomy, Astrophysics and Space Sciences.
- To provide financial support for the promotion of science communication, cross learning holding Seminars/ Workshops/ Science competitions/ Science Exhibitions etc.
- To provide financial support to Scientists/academicians of the State to participate and interact in the higher forums of International Conferences by presentation of their research/technical/scientific papers.

3. ACTIVITIES OF ALL AGENCIES

3.1 ODISHA SPACE APPLICATIONS CENTRE (ORSAC)

The Odisha Space Application Centre (ORSAC) is the nodal agency for promotion and application of space technologies like remote sensing, GIS & GPS, DGPS & ETS (survey) applications by user departments of the State for better planning and making decisions effectively.

Achievements:

- **Development of Block Level Resource Atlas and Geographic Information System (GIS) Database:** Geo referencing of 314 blocks completed. Pre-fill land-use for 300 (blocks) completed.
- **Urban Land Information System:** Input generation has been completed for Comprehensive Development Plan of 59 towns.
- **EDUSAT programme:** 493 Web-based class-rooms teaching of 183 days duration were conducted for class-IX & X students on English, Mathematics, Science & geography.
- **DGPS survey of Mining Lease Areas:** Survey of 140 mines has been successfully completed for effective planning and monitoring by Steel & Mines Department.
- **Forest area proposed for Diversion/Compensatory Afforestation projects.** ORSAC has completed authentication of maps showing forest areas for Diversion/Compensatory Afforestation in 58 infrastructure projects.
- **Odisha Land Bank Project:** 1.19 lakh acres of land have been identified and webhosted along with pollution potential index.

- **Odisha Industrial Infrastructure Web-GIS data base:** Go-Plus version 2.1 launched for Industry Department.
- **Development of Odisha Irrigation Infrastructure Web-Portal (ODIis):** GIS mapping of irrigation infrastructures for 6 Departments has been generated.
- **Monitoring of Afforestation/Plantation in Odisha:** Geographic Information System (GIS) & Remote Sensing (RS) based monitoring of plantations of 28 forest divisions has been completed.
- **Working Plan input map for Forest Department:** Input generation for 34 forest divisions to prepare GIS & RS based forest inventory and management plan has been completed.
- **Natural Resources survey 3rd cycle:** Mapping of land-use and land-cover, wasteland and land degradation for 30 districts has been completed.
- **Odisha Spatial Data Infrastructure (OSDI):** Hardware and software have been installed at State Data Centre. 1st version of SDI is under generation.
- **Crop Intensification project:** 9.0 lakh hectares of post khariff rice fallow lands have been indentified for short duration pulse crop.
- **Climate Change Action project:** Differential Global Positioning System (DGPS) observations on Secondary Control Points (SCPs) of Puri & Jagatsinghpur districts have been completed.
- **Coastal Zone Management Plan:** Coastal Restricted Zone maps of Ganjam, Puri and Khurdha districts have been finalized with respect to high tide line.

3.1.1 ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY (OREDA):

Odisha Renewable Development Agency (OREDA) is the Nodal agency for implementation of various renewable energy programme from natural resources for the benefit of society, environment and to ensure energy security for the people of the State. It works towards a long term solution for meeting energy needs & access, reducing dependence on conventional energy sources and achieving the climate change objectives.

Achievements:

- 1483 Solar Water Pumping Projects have been commissioned for supply of safe drinking water in rural areas benefiting about twenty lakh people.
- 191 Solar Irrigation Projects have been commissioned for providing irrigation in power starved areas benefiting about 886 farmers to take up round the year cropping in more than 3000 acres.
- 1050 Kwp capacity off-grid Roof Top Solar Power Plants with battery back-up in hybrid mode has been installed to provide electricity to schools, hostels, police stations & health centers in remote and in-accessible areas where conventional grid connectivity is not available.
- 450Kwp installed capacity on-grid roof top solar power plant created.
- 335 villages in remote areas have been electrified with standalone solar power plant under DDG scheme benefiting 13230 households each with 4 lights and one fan, and one street light per five households.
- In TASP area, 100 villages have been electrified through solar power plant benefiting 4001 tribal households each with 2 LED bulbs, one DC fan and one street light per 10 households.
- 9417 solar lanterns with 7W CFL lamp has been provided to artisans of handicraft and handloom sector to increase their productivity through extended working hours.
- 98 improved chullahs and 6771 Unnat Chullahs (Parishada model) have been installed providing clean energy to households that reduces carbon emissions.
- 531 Family Biogas plants have been installed for safe cooking, light, bio-fertilizer and nutrient rich organic manure.

3.2 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 implementation of various schemes and programs in the State.

Achievements:

- 200 scholarships @ Rs.2000/- per month have been provided to students for pursuing Post-Graduation studies in Basic Science subjects such as Physics, Chemistry, Mathematics, Botany, Zoology and Geology.
- Biju Patnaik Research Fellowship in Basic and Applied Sciences has been given to **10** students for pursuing Ph. D.
- Financial assistance limited to Rs.10.00 lakh for each R&D project for a period of 3 years duration has been provided to Government Universities/institutions to undertake **19** R & D Projects in Basic & Applied Sciences.
- The proposal for enhancement of UNESCO Kalinga Prize money from USD 20,000 to USD 40,000 has been approved by Government.
- State Council has felicitated Prof. Golombek, the UNESCO–Kalinga Prize winner of 2015 during his visit to Odisha.
- Financial support to the tune of one lakh has been provided to Regional Science Centre, Bhubaneswar for holding a State Level Science Exhibition of school students from all the districts.
- Financial support has been provided for organizing **two** International, **eight** National and **one** State level conference.
- Travel Grants have been sanctioned to **3** Scientists /Academicians of the State to give oral presentation in Taiwan, China and Australia respectively.
- The Science & Technology Department has established a Patent Information Centre (PIC) in Odisha. Seven workshops have been organised by Patent Information Centre of Science & Technology Department at different Universities and Research Institutes of Odisha during 2017-18. Ten patent applications received from universities/institutions were sent to Technology, Information, Forecasting and Assessment Council (TIFAC) Govt. of India for examination & patent filing, out of which 3 applications have been found suitable for patent filing and rest are in the process of examination.
- State Council has participated in the 105th Indian Science Congress and Science Exhibition ‘Pride of India’ (POI) EXPO’2018 at Imphal from 16-20 March, 2018. Science & Technology Department, Government of Odisha Pavilion has been awarded as the best State Pavillion.

- A Sub-Regional Science Centre is being set up at Mouza-Tukurla under Bhatli Tahasil in Bargarh District in the State, which is under progress. Further, steps are being taken up for setting up of 10 more District Science Centers in the State under State Plan.

3.3 BIOTECHNOLOGY CELL

Biotechnology is a frontier area of applied basic science with immense benefits to the society in diverse areas such as food security, nutritional supplementation, affordable health-care products and potential 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.

Achievements:

- Biotechnology Policy Resolution -2016 has been announced to bring investment in Biotechnology Sector and promote education and research in Biotechnology.
- All operational guidelines relating to Biotechnology Policy Resolution-2016 have been released.
- Government has provided six Biju Patnaik Research Fellowship in Biotechnology to students to pursue Ph.D.
- Government has provided one Emeritus Fellowships in Biotechnology.
- Financial assistance limited to Rs.10.00 lakh for each R&D project for a period of 3 years duration has been provided to Government Universities, Colleges, State funded Research Institutes of Odisha and Research Institutes of Government of India functioning in Odisha to support fifteen Research & Development Projects in Biotechnology.
- 32 students have been provided with scholarships @Rs.2000/PM for pursuing Post-Graduation studies in Biotechnology in different Government Universities and Colleges of the State.

3.4 INSTITUTE OF MATHEMATICS AND APPLICATIONS (IM&A), BHUBANESWAR

The main aims and objectives of the Institute of Mathematics & Applications are to pursue teaching programme on higher mathematics, research & its applications, to

search and nurture talents in mathematics, to set up advanced computing centre and to offer specialized courses.

It offers B.Sc. (Hons) in Mathematics and Computing and M. Sc. (Computational Finance) with intake of 30 students in each course. The B.Sc. (Hons) course is devoted to higher studies on applications of mathematics to modern developments of computers. Similarly, the M. Sc. Course is designed keeping in mind the mathematical requirements of stock market, risk managers and other financial institutions like insurance companies. Both the courses are rare in the country and students get better future prospects.

Achievements:

- **Publication of Research Papers:** Seven (07)
- **Award:** Dr. Sudhanshu Sekhar Rout got qualified for “Best Research paper award” by the India Mathematical Society
- **National Workshop:** “National Workshop on LaTeX” was organized during 23rd and 24th March 2018.
- **Olympiad Nurture Programme for School Children:** 149 students have been trained in 03 training camps to make them ready to compete for Olympiads.
- **Nurture Programme for School Children of rural areas:** 577 students selected through Pathani Samanta Medha Brutee test accompanied by 209 guide teachers have been trained in 07 training camps.
- **Interactive camps for under graduate students:** 39 students from 202 Blocks have successfully completed their interactive course on problem solving methods leading to scope for research in one camp.
- **Programme for SC/ST students:** An outreach programme for 100 School children of ST/SC category was conducted at Ujalpur Girl’s High School, Ujalpur, Sundargarh during January 2018.
- **Special Training to Girl students:** Four days expository Mathematics Training Camp for 57 girls belonging to Paudi Bhuyan tribe of Vi to VIII standard has been conducted during January 2018.
- **High School Teachers’ Refresher Course in Higher Mathematics:** 408 teachers were trained in 07 camps.

- **Achievements by students:** Mr Amartya Mruthal and Mr Utkarsh Neve of IMA are among three students of Odisha to be shortlisted by National Board for Higher Mathematics for higher training for their outstanding performance in Madhava Mathematics Competition 2018.
- **Organization of Weekly Seminars:** IMA has conducted 50 seminars for students and faculty as well on recent trends in mathematics and its applications.
- **Summer Internship Programme** for Post Graduate and Under Graduate students: Two external students successfully completed their internship in IMA.

3.5 PATHANI SAMANTA PLANETARIUM (PSP), BHUBANESWAR & DR APJ ABDUL KALAM PLANETARIUM, BURLA.

Planetaria at Bhubaneswar & Burla are premier institutes of the state for popularization of science in general, Astronomy, Astro-Physics and Space Science in particular. The objectives & functions of Planetarium are to bring the awe & wonders of the universe through various programme throughout the year.

Achievements:

- At present, the shows are conducted in Odia, Hindi & English languages with different programme of duration ranging from 25 to 35 minutes such as (i) Akash ra asaranti katha (ଆକାଶର ଅସରନ୍ତି କଥା) (Odia) (ii) Rahasyamaya surya (ରହସ୍ୟମୟ ସୂର୍ଯ୍ୟ) (Odia) (iii) Biswa ra rahasya (ବିଶ୍ୱର ରହସ୍ୟ) (Hindi) and (iv) IBEX : Search for the edge of the Solar System (English), (v) Biography of Universe (Hindi) and (vi) Star of Pharoas (English)
- A total number of 1, 54,126 and 1, 32,879 visitors have witnessed and enjoyed various shows in Bhubaneswar and Burla Planetarium. The Pathani Samanta Planetarium, Bhubaneswar and Dr. APJ Abdul Kalam Planetarium, Burla have earned revenue of Rs. 36,51,545 and Rs.31,22,850 respectively during the financial year 2017-18.
- Pathani Samanta Museum, Khandapada has been operational since 21st December, 2016. Forty one Exhibits/ Models/ Panels on life and works of Samanta Chandrasekhar with ancient Indian Astronomy have been displayed in

the Museum. Total 21,831 visitors have witnessed the Museum during 1st April 2017 to 31st March 2018.

- Government has approved to establish 4 more planetaria at Gopalpur (Ganjam), Rayagada, Baripada & Keonjhar.
- Two Digital Mobile Planetarium Systems have been in operation at Rayagada and Malkangiri as outreach programme of the Department.
- Like every year, this year on 13th December, 2017, on the birth Anniversary of Pathani Samanta, 20 selected Young Astronomers of the state were awarded by the Hon'ble Chief Minister of Odisha. They are encouraged to pursue their career in Science in general, Astronomy, Astrophysics & Space Science in particular
- A Space Gallery is going to be established in the premises of PSP, Bhubaneswar with active support from Space Application Centre, ISRO, Ahmadabad shortly.

3.6 ODISHA BIGYAN ACADEMY (OBA), BHUBANESWAR

The aims and objectives of Odisha Bigyan Academy (OBA) are to promote and popularize science amongst people of Odisha, based on informed knowledge emanating from various frontier fields of Science & Technology.

Achievements:

- Monthly popular science magazine 'Bigyan Diganta' (Odia) published regularly and distributed to Government recognized High Schools of Odisha, free of cost every month.
- Monthly popular science magazine 'Science Horizon' in English published regularly and distributed to Government English medium High Schools, Government +2 Science Colleges and +3 Degree Colleges of Odisha free of cost every month.
- Abridged version of Quarterly Science magazine 'Bigyan Diganta' in Odia Braille script published regularly and distributed to institutions and visually handicapped students of Odisha.
- Hon'ble Chief Minister, Odisha felicitated senior scientists, eminent scientists, and young scientists for their excellence and contribution for popularization of science education, communication, research and development with various awards for the year 2014, 2015 and 2016.

- OBA celebrated its foundation day on 01.04.2017 (Utkal Divas). On this occasion, Quiz, Sit & Draw Competitions were conducted among the High School Students of Odisha.
- OBA celebrated World Science Day for Peace & Development, World Disability Day, and National Science day with large participation of students and teachers. The winners of essay, debate and science projects were awarded on National Science Day. The Wikipedia of OBA was launched during celebration of National Science Day.
- OBA organized District Level Interactive Sessions of Science Teachers and Students at Bhubaneswar during 14-15, October, 2017. Selected students and Science Teachers of all the 30 districts have participated and interacted with eminent scientists of Odisha in those sessions.
- Odisha Bigyan Academy organized a Writers Workshop for writing in 'Bigyan Diganta' and 'Science Horizon' on 23.09.2017. The purpose of the workshop was to improve the quality of science writing for 'Bigyan Diganta' & 'Science Horizon' published by Odisha Bigyan Academy. Many renowned writers in science of Odisha were the resource persons for the said Workshop and suggested their views.
- OBA organized a Popular Science Talk “Recent Trends in Advance computing” on 16.09.2017 delivered by an eminent Scientist Prof Lalit Mohan Patnaik in the Conference Hall of Odisha Bigyan Academy, Bhubaneswar.

3.7 Institute of Materials Science (IMS)

The main objectives and functions of Institute of Materials Science are to facilitate research in the frontier areas of material science and to conduct interdisciplinary research on special materials, their development, optimization, production and utilization.

Achievements:

- IMS has published 6 papers in the International Journals
- One research scholar is going to submit his thesis for Ph.D
- One M.Tech student from Central University Jharkhand has successfully completed his summer internship project in IMS

- One SRF has attended 2nd International Conference on condensed matter & applied physics organized by Government Engineering College, Bikaner, Rajasthan.
- One invited talk delivered by Dr D R Sahu, Namibia University on “Electrochromism, WO₃, Electro chemical cycle”.