RESEARCH AND CONSULTANCY CELL, IIEST SHIBPUR

Sponsored Research and Industrial Consultancy (SRIC)

Research Overview

In the light of changing economic scenario, government policies and Institute priorities, the Institute considers sponsored research and industrial consultancy projects as a very important means for extending benefit of scientific research work at the Institute for the benefit of the society as well as for the economic growth of our country. Therefore, as a matter of policy, the Institute encourages its faculty members to undertake research and consultancy work as a measure of scientific and technical collaboration with outside sponsored agencies. Research and consultancy projects provide knowledge of the current problems of industry and the emerging areas which are very helpful in tuning the curriculum to the national needs.

The Research and Consultancy Cell has, of late, matured into the singular channel for diverse externally funded research and industrial consultancy at the Institute. As of now its principal role is to act as a facilitator for R&D activities at the Institute including coordination in administration, managerial, liaison, monitoring etc, of sponsored research and consultancy work within the ambit of the administrative framework of the institute. But, in consonance with the 'Make in India' thrust of the Government and in tune with the technology roadmap of the country, the Cell is now gearing up to play a greater role to act as the hinge point for multi-institutional and interdisciplinary mega research for which the Institute is now well poised.

A tradition of uncompromising quality-concern has put the Institute in good treads and, over the last few years, a good number of government and non-government funding agencies like DST, DIT, DAE, BRNS, DRDO, ISRO, UGC, CSIR, AICTE, Ministry of Steel, Ministry of Defense, SMDP, UNICEF, MNRE, TATA Steel, TISCO, SAIL, NML, ICDC, NMRL, Indian Council of Medical Research, Ministry of Earth Science, Dept. of Biotechnology, Digital India Corporation and others have come forward to sponsor research projects. Presently the Institute is putting a purposeful thrust on collaborative research both at national and international level.

The Institute enjoys a reputation for excellence in research and development. Casting a glance at its academic departments, the Institute can boast of commendable performance of its faculty members, particularly their quality research output which is reflected by a good number of publications in peer-reviewed national and international Journals.

A significant number of research projects has been funded by international funding agencies like CIDA, USAID, DeIPHE, SANEI etc. which bear testimony to the quality of research programs carried out at the Institute. In the recent past Institute shared its research accomplishments with IISc (ACRC) Bangalore, IBM Kolkata, TATA Steel, SAIL, Infosys, DRDL, CPRI, TCS etc.

Institute is participating in the national program “One Nation One Research Web Portal” for scientific community called the Indian Science Technology and Engineering facilities Map (I-STEM) : *Linking Researchers and Resources*, to hold the database of all the R&D facilities established in the institution and to enable their sharing in a transparent manner. Institute has established Sophisticated Analytical Instruments Facility (SAIF, established by DST New Delhi) and Central Research Facility (CRF for providing advanced instrumental facility and scientific services), Continuing Education Programme (CEP), SPARC projects etc. On an average 35 new research projects are received by IIEST in a typical year. In the last decade, RACC has handled about 336 research projects worth Rs. 152.00 Crs. On an average 60 new consultancy projects are received by

IIEST in a typical year. In the last eight years, RACC has handled about 465 consultancy projects worth Rs. 25.00 Crs.

Major Research Areas

Besides the conventional fields of technology and science, the Institute in recent years has brought many frontier areas of S&T under the purview of its sponsored research activities. Some of such areas are: Advanced Materials, Bio-Mechanics, Bio-materials, Earthquake Dynamics, Disaster Management, Environmental Remediation, Fuel Cell, Green Energy and Sensors, Healthcare Science and Technology, Mobile Computing, Nano Science and Technology, Power Electronics, Remote-sensing and GIS, Space Technology, MEMs fabrication, Structural Engineering, Surface Engineering, VLSI and Embedded Systems, Communication, Sensor Network, Mechatronics and Robotics, Water Resource, Turbulent Flow, Carbon Sequestration, Atomic and Nuclear Physics, Soft Computing, Image processing, Housing and Human Settlement Planning, Electrochemistry, Fuel Cell, sedimentology, environmental economics, Mathematical and Statistical Theory of Life Testing and Reliability and Technology awareness for society etc. Major augmentation in infrastructure for facilitating academic, research and administrative activities has been undertaken.

R & D History

IIEST is an institution of International standard and is producing quality manpower for the strategic sector of research and development in our country, research laboratories, modern industries and also quality teachers for the Institutions of engineering and science education. This reflects the aspirations of the people of India from us.

The world today faces extraordinary challenges and opportunities in several areas, such as, energy, healthcare, water and environment, advanced material, fabrionics, transportation and telecommunication. The solutions of the challenges in each of these areas need an interdisciplinary approach. Today's students should be ready to approach and solve these most pressing global problems with an unbiased, innovative and independent mind. Our Institute today strives hard to contribute significantly in each of these areas.

The clock tower of the Institute has witnessed the growth and development of one of the earliest engineering Institutes in the country. The tower reminds us of our obligations and responsibilities towards our future generations in ensuring a healthy, strong and self-reliant India. With deep sense of gratitude to our glorious past and strong conviction for a brighter future, we reaffirm our commitment in dedicating ourselves to the service of the nation.

Featured Research

Centre for Excellence for Green Energy and Sensors System (CEGESS) has been recognized by Ministry of New Renewable Energy (MNRE) and also by DST Solar Hub with an objective to perform research and development on large scale silicon solar photovoltaic cells, modules and systems including design, fabrication and characterization using novel materials and methods. Two major nationally important projects under Jawaharlal Nehru Solar Energy Mission (JNNSM) on thin film silicon solar cells and PV systems sponsored by MNRE, Govt. of India (Rs. 14.76 Cr.) and Solar Photovoltaic Hub at IIEST sponsored by DST, Govt. of India (Rs. 12.32 Crs.) have been awarded to CEGESS.

The Ministry of AYUSH, Govt. of India through the Central Council of Research in Homeopathy has sanctioned the establishment of Dr. Bholanath Chakroborty Fundamental Research Laboratory on Homeopathy with a total planned funding support of Rs. 11.00 Crs with an objective to undertake

focused, evidence-based research on homeopathy formulation and validate their mode of action. The Fundamental Research Laboratory Centre under Healthcare Science and Technology (CHST) is poised to house several high-end equipments and will act as a coordinating centre for different researchers across the country interested in scientific evaluation of medicines belonging to this AYUSH system.

CHST is also involved in a DBT, Govt of India funded multi-institutional project (total cost Rs. 5.00 Crs.) in association with IISc Bangalore, IIT Kanpur etc. for design and manufacturing of orthopedic implants. DST SERB has sanctioned Nanomission project on 3D printing of polymer composites for patient-specific bone tissue engineering and a multi-institutional project on 'Bioprinting of 3D retina on microfluidic chip' (with NIT Raipur). Work is also underway to develop low cost benchtop microscope with NIT Rourkela and Medical College, Kolkata for early screening of cervical cancer under DST, IDP program. Collaborative projects are also carried out with CGCRI Kolkata, IIT Kharagpur and AIIMS New Delhi etc. on different healthcare problems like isolation of active molecules from plants against cancer, RNA delivery and developing vascularised engineered constructs to overcome a major bottleneck in tissue engineering.

Socially relevant research

Funding Agency	Title of the Project:
Tribal Cooperative Marketing Development Federation of India (TRIFED), Ministry of Tribal Affairs, Government of India.	Process developments for isolation of starch and tannin from sal cake.
UGC, New Delhi	Study on production of single cell protein for food and feed application from waste fruits.
Department of Food Processing and Horticulture, Govt of West Bengal	Creation of infrastructural facilities for running degree course in food processing technology.
GRSE (Garden Reach Shipbuilders & Engineers Limited), Kolkata, Govt. of India undertaking under the Ministry of Defence	Social out-reach programmes.
Ministry of Consumer Affairs, Food & Public Distribution (Department of Ministry of Food & Public Distribution), Directorate of Vanaspati, Vegetable Oils & Fats, New Delhi	Development of technology to make low cost nutritionally effective 'ready to eat' protein rich human food from oil seeds or deoiled edible seed cakes (seed meals) by co-extrusion with cereals.
Bharat Petroleum Corporation Ltd., Mumbai	Provide vocational training to unemployed youth on various Module/Trades under CSR activity.

R & D Profile

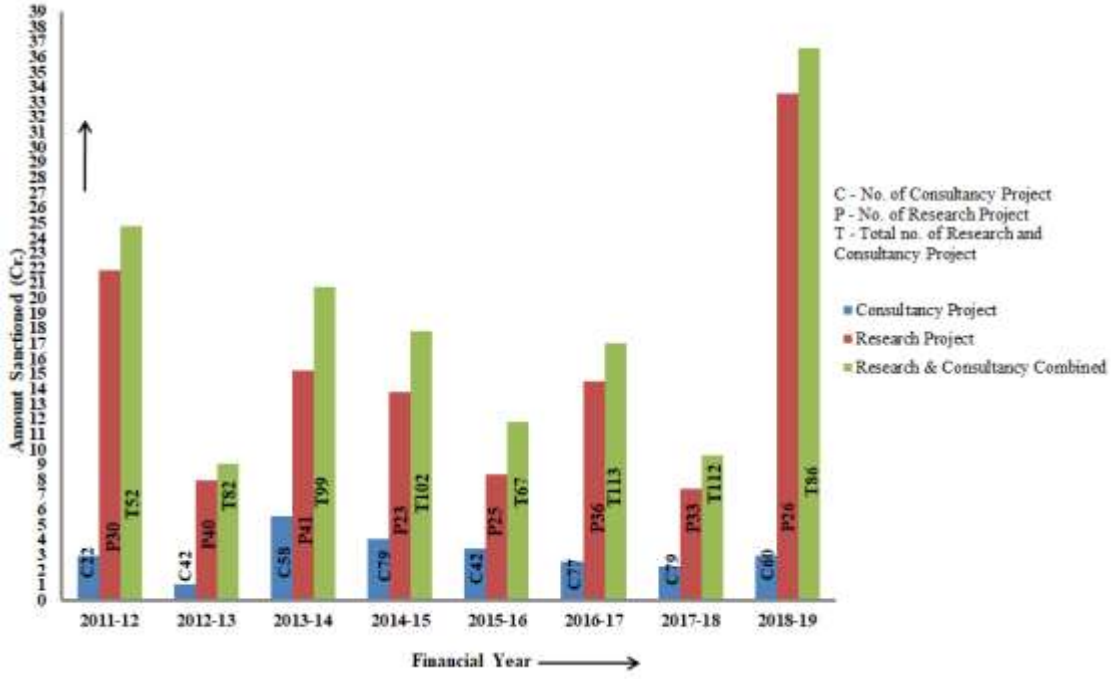
In 2017-18, Institute received 33 nos. of new sponsored research projects with a sanctioned amount of Rs.7.38 Cr. Almost all the Departments, Schools and Centres received such sponsored projects. Significant funding came from organizations/ agencies like the Department of Science and Technology, Government of India; The Royal Society UK; Tata Steel. Ltd.; Murata Business Engineering (India); UNICEF, IC-IMPACTS, Canada; The Institution of Engineers (India); the Council of Scientific and Industrial Research; the Central Council for Research in Homeopathy (CCRH), Ministry of Ayush, Govt. of India; Bharat Heavy Electricals Limited (BHEL); Electrosteel Castings Ltd. (ECL); Global Innovation and Technology Alliance (GITA); Dept. of Biotechnology, Indian Council of Medical Research, Dept. of Health Research. Thrust areas of sponsored research

included (i) High energy density rare earth free permanent magnet, (ii) Motor drives for semi-electric/ manual assist bicycle, (iii) Pollution control of the river Ganges, (iv) Clean energy, (v) New Peptide based synthetic self-replicating system, (vi) Fundamental research in homeopathy (vii) Flexible super capacitors (viii) Extreme Point of Care Diagnostics on a CD etc.

In 2018-19, total 26 new sponsored projects (DST, Dept. of Biotechnology, Electrosteel Casting Limited (ECL), Digital India Corporation, DST-FIST, Indian Council of Medical Research, UNICEF, Ministry of Earth Science, CSIR etc.) have been approved with a total sanctioned amount of Rs. 33.56 Cr. Title of few important research projects include i) Flexible polymer nanocomposite films for energy generation and microwave shielding applications ii) Performance optimization organic solar cells iii) Scaling up WASH approach in schools in Purulia District, iv) DST Solar PV Hub Phase - II, v) Study of seismic failure possibilities of earthen dams and embankments by dynamic and response analysis using finite element method etc.

In 2018-19, about 134 projects were running in the institute with a sanction amount of Rs. 88.94 Crs. from different funding agencies like INTEL, SERB, DST, BRNS, CSIR, DBT, UNICEF, CCRH,ICMR,IC-IMPACTS, RS, AHUT, TATA STEEL, ACC, UCG-SAP, WBPDCL, EI, DIC-MLA(VIS), NMPB-MOA, MLA-DEITY(VIS), TATA STEEL, DST, NMRL-CARS, PHED-GOWB, GITA, MURATA, NRDC, ICMR, SDF-TATA, MoES, DST, TATA STEEL, BRNS, SERB, IEI, UOL, CMPDI, DST-SAIF, SHH-K-WB, SHH, MHRD-IITKGP, MoT, FPI&H, ECL, DEITY-MCIT, WBREDA, OZTRON, MNRE, HITK, TSECL, BHEL. In 2018-19, 23 projects have been completed with a sanction amount of Rs. 17.83 Crs.

Over the last few years, in tune with the Institute policy of strengthening national and international collaboration, the Institute has signed quite a number of MoUs with various academic/ research/ government organisations and Industry houses. Institute signed 15 MoUs each in 2016-17 and 2017-18. In 2017-18, Institute signed MoU with BHEL, TATA Steel, Murata Business Engineering, TATA Motors Ltd. In 2018-19, institute signed 2 MoUs with Indian Institute of Technology (Indian School of Mines), Dhanbad and Bharat Petroleum Corporation Ltd.



The above chart shows the no. of new sponsored research and consultancy projects sanctioned in the FY 2011-12 to 2018-19.

Consultancy Projects

Important funding agency like Haldia Development Authority, Howrah Municipal Corporation, Kolkata Port Trust, Rail Vikas Nigam Limited, Kolkata Metro Rail Corporation Limited, Hooghly River Bridge Commissioners, Western Coalfields Limited, Mackintosh Burn Limited, Kolkata, Kolkata Metropolitan Development Authority are providing important consultancy work.
Title of important consultancy projects includes:
i)Consultative Collaboration on Research between IIEST, Shibpur and KMRCL for Kolkata East West Metro Project
ii) Study of EIA/EMP and Bank Protection Study within Port limits in Halisahar Municipality
iii) Renovation of Kedarnath Arogya Bhavan, Bali
iii) Vetting of Structural design and drawings for Logistic Hub at Garden Reach, Kolkata under KMDA
iv) Traffic Survey (7 days, 24 hours) of Vidyasagar Setu
v) Rain water harvesting of artificial rechanrge for Khagra Joydev Coal Block at Birbhum District of West Bengal
vi) Scientific study for stability of dragline dump at Mungoli OCM of Wani Area, WCL

From April 2017 to March 2018, Institute carried out about 79 new consultancy work at a sanctioned amount of Rs. 2.25 Cr in different engineering departments namely, Civil, Mining, Architecture, Mechanical, Green Energy, Electrical and HRM Department. Some of the sponsors of these consultancy work includes Bengal Shipyard Limited, Kolkata, West Bengal Medical Services Corporation Ltd., Govt. of West Bengal, Development Consultants Private Limited, Byucksan India Pvt. Ltd., Kolkata Port Trust, Mackintosh Burn Limited, National Museum of Denmark (NMD), Eastern Coalfields Limited, Haldia Development Authority, KMDA, Kolkata, HINDALCO, RITES Ltd.

In 2018-19, total 60 new consultancy work sponsored by Kolkata Municipal Corporation, West Bengal Medical Services Corporation Limited, P.W.DTE, Govt. of West Bengal, Haldia Development Authority, IIT Kharagpur, Weastern Coalfields Limited, Larsen & Toubro Limited, ITD Cementation India Ltd., Coal India Limited, Kolkata Port Trust, Rail Vikas Nigam Limited, Kolkata Metro Rail Corporation Limited, Hooghly River Bridge Commissioners, Second Vivekananda Bridge, Visva Bharati University, Mackintosh Burn Limited, Kolkata, ECL, Kolkata Metropolitan Development Authority, Gorkhaland Territorial Administration, Darjeeling have been received with a value of Rs. 3.00 Cr.

In 2017-18, the Institute carried out 44 testing jobs received from 20 different organizations. An overwhelming majority of the testing work was carried out by the Civil Engineering Department.

Innovations

Patents

Sl. No.	Name of Faculty/Students	Title of Patent	Date of Filling of Patent	Date of Patent Publication	Patent No./date (If granted)	Inventor(s)
1	Snehangshu Patra	An energy saving method for fabrication of electrode in wastewater and product there of	26.06.18	13.07.2018	201831023702	Pavel Majumdar and Snehangshu Patra

2	Anirban Bagui	Manufacturing of organic photovoltaic devices	09.03.11	14.09.12	654/DEL/2011	Anirban Bagui, S. Sundar Kumar lyer
3	Anirban Bagui	A glove box for electric field annealing and fabrication of organic electronic devices	06.01.15	19.08.16	33/DEL/2015	Anirban Bagui, Anukul Parhi, S. Sundar Kumar lyer
4	Hiranmay Saha, Joydip jana, Abhijit Das	A remote monitoring device for solar photovoltaic systems	14.02.17	07-04-2017	201731005209	
5	Hiranmay Saha, Hiranmay Samanta, Joydip Jana	A novel P&O mppt technique based five stage battery charge controller for solar photovoltaic systems	30.05.17	07-07-2017	201731018941	
6	Dr. Anindita Sengupta	A yarn Characterisation Unit (897/kol/2014)	29.08.2014	26.08.2016		Dr. Anindita Sengupta, Dr. Subhasish Roy, Dr. Surajit Sengupta
7	Dr. Anindita Sengupta	A system for testing Dynamically bending behaviour of semi-rigid fabrics and a method of such testing (1118/kol/2014) FER Received	01.11.2014	26.08.2016		Dr. Surajit Sengupta,Dr. Sanjay Debnath,Dr. Anindita Sengupta
8	Dr. Paramita Chattopadhyay	Artificial Neutral Network Based Adaptive Over Current Relay	02.06.2017	08.09.2017	201731019385	Dr. Paramita Chattopadhyay, Subhrajit Mitra, Dr. P. Konar
9	Dr. Paramita Chattopadhyay	Nano material including Amourphous Graphene and Nano Fluids involving the same with a base medium having significantly Enhanced Electrical Insulation and Thermal Conductivity	15.11.2017	8.12.2017	201731040823	Dr. Paramita Chattopadhyay, Dr. K. K. Chattopadhyay, Ms. M. Bhunia

10	Soumyajit Podder and Hafizul Rahaman	A Photonic Inter-Processor Communication Bus for data Transfer in Homogeneous Multicore High Performance Computing Systems	18.04.2016	13.05.2016	201631013438A	Soumyajit Podder, Prof. Hafizur Rahaman
11	Dr. Chirasree Roy Chaudhuri	Non-Invasive Camera Less Wireless Sensor System for Monitoring of Elderly People Staying Alone (in the name of IIEST, Shibpur)		20.10.2017	647/KOL/2015	Nirmalya Samanta, Amit Chanda, C. R. Chaudhuri
12	Dr. Chirasree Roy Chaudhuri	A High Performance Low-Cost and Field Deployable Impedance Biosensor for Bacteria Detection on Macroporous Substrates (in the name of BESU, Shibpur)		20/10/2017	647/KOL/2015	Ramkrisjna Dev Das, Sumantra Das, C. Roy Chaudhuri

Contact address:

Office of Dean of Research and Consultancy
6th Floor, New Science & Technology Building
Indian Institute of Engineering Science and Technology, Shibpur, Howrah – 711 103
Ph. (033) 2668 4561 / 62 / 63 Extn. 256 / 271 / 267 Fax (033) 2668 2916
Email: dean.research@iiests.ac.in , director_rc@iiests.ac.in Website: www.iiests.ac.in