

BIOTECH EXPRESS

Editorial Report: Excerpts: DBT, India Annual Report 2018-19

Editorial: SPIN to WIN the Battle of Publications: Recent Trends of Scientific Fraud and Misconduct in Manuscript Preparation

Guest Article: ASPIRE-BioNEST at UOH: Nurturing Entrepreneurship and Scaling Technologies in Life Sciences

Press Release: Speakers in International Conference on New Horizons in Biotechnology (NHBT-2019)

DBT-BITP call

National Science Communication Awards 2019

Sun Pharma Research/Science Scholar Awards 2019

Janaki Ammal-National Women Bioscientist Award 2019

GATE + JAM 2020 Notification



CURRENT TOP NEWS

New council members of INSA : Biologist Chandrima Shaha elected INSA's first woman president in 85 Years

Rotavirus vaccination to be expanded across India by September 2019

Authorship in 73 journal papers from India up for sale

ICMR-NICED scientist has 16 papers with duplicated, manipulated images

Events: 16th BRSI Convention, Kerala, 22-24 November 2019

International Conference Horizons in Biotech



*India's Biggest Biotech
scientific talent and Industry*

Trivandrum, Kerala



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Scientists-Children Meet
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See List of Speakers Inside

Chennai, India. November 20-24, 2019



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August 2019

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From the very first issue, Biotech Express team has been delivering what's best for Biosciences community. The audience of this magazine includes students, researchers, faculties and executives of highly prestigious organizations of India. In year 2016, BEM has made new editorial Board combining experience of eminent Advisory Board Members who have been into Award winning Research and head prestigious Administrative positions.

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Editorial Report

Excerpts: DBT, India Annual Report 2018-19

The Department of Biotechnology (DBT), under the Ministry of Science and Technology setup in 1986 has laid emphasis on promotion of excellence and innovation for discovery, early and late stage translational research in the areas of agriculture, affordable healthcare & medical technology, food & nutritional security, animal biotechnology, environmental safety, clean energy & bio-fuel, bio-manufacturing, etc. This article highlights current major achievements and existing programmes of biotechnology in India which comes under control of DBT, India.

TEACHING PROGRAMMES Supported by DBT

(i) Postgraduate Teaching Programmes (M.Sc./M.Tech./M.VSc.)

A total of 72 courses are being offered under this programme. The location of universities/ institutes offering M.Sc./ M.Tech/M.VSc. teaching programmes in biotechnology in country with DBT

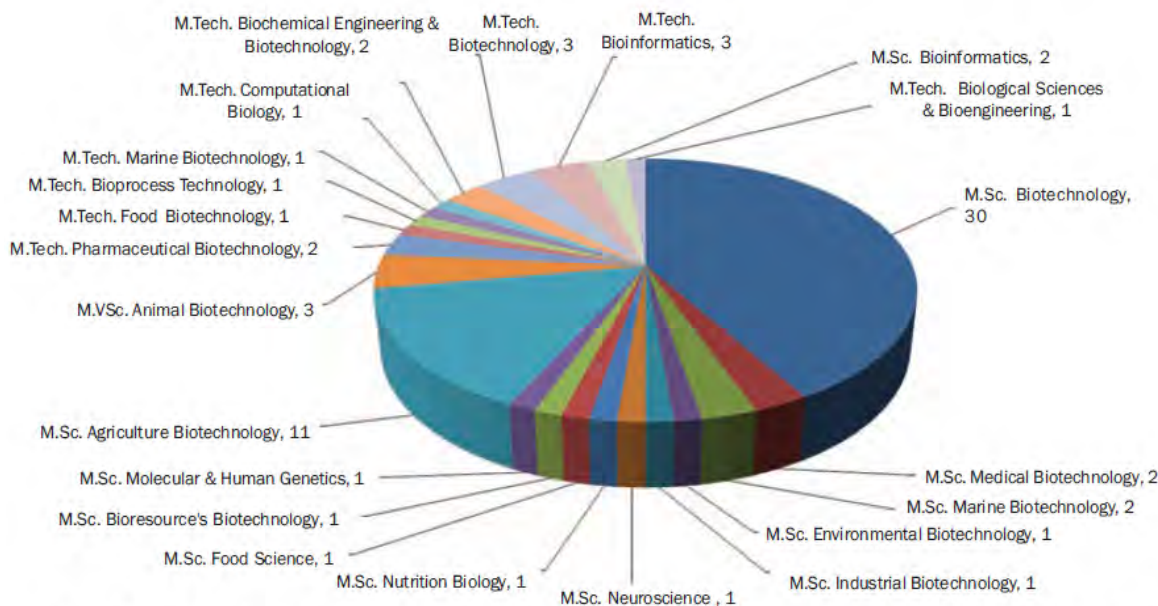


Legislations passed in current year

The DNA Technology (Use and Application) Regulation Bill: The Lok Sabha has Passed “The DNA Technology (Use and Application) Regulation Bill” in January 2019. The Bill has been formulated for the regulation of the use and application of DNA technology with the aim to establish the identity of certain category of persons including the victims, offenders, suspects, under trials, missing persons and unknown deceased persons and provides provision for establishment of a DNA Regulatory Board (DRB).

National Guidelines for Stem Cell Research: The DBT jointly with ICMR has formulated and revised National Guidelines for Stem Cell Research. As per the recommendation of the inter-ministerial meeting, “National Guidelines for Stem Cell Therapy” is also being formulated jointly with ICMR and other stakeholders.

support is depicted in Map. DBT supported postgraduate teaching programme in biotechnology continues to selecting best students and impart quality education with intensive hands on training. To ensure admission of quality students, selection is made through an All India Common Entrance Test conducted by JNU, Joint Entrance Test conducted by IIT and national test conducted by other universities. All selected candidates are offered studentships. During the year 2018-19, five new PG proposals were considered by DBT-HRD Task Force. One PG teaching proposal in area Medical Biotechnology was recommended for support.



Area wise number of universities/institutes conducting DBT supported PG teaching programmes.

(ii) Skill Development Programme in Biotechnology:

This program has been designed for providing skill training under four categories:

- (i) Skill training for students
- (ii) Technician training
- (iii) Faculty training and
- (iv) Entrepreneurship training.

Expert committee on skill Vigyan recommended the proposals of six states for support. Department has approved the proposal of five States in 2018-19.

(iii) Star College Scheme:

Star College Scheme was initiated by DBT to support UG colleges and university departments offering undergraduate education to improve science teaching. At present, 20 colleges under Rural category and 96 under Urban category have been supported under this Scheme. So far Department has received 710 proposal and supported 189 colleges under Star College Scheme since 2008-2018.

NATIONAL FELLOWSHIP PROGRAMMES

(i) DBT Junior Research Fellowship (DBT- JRF) Programme:

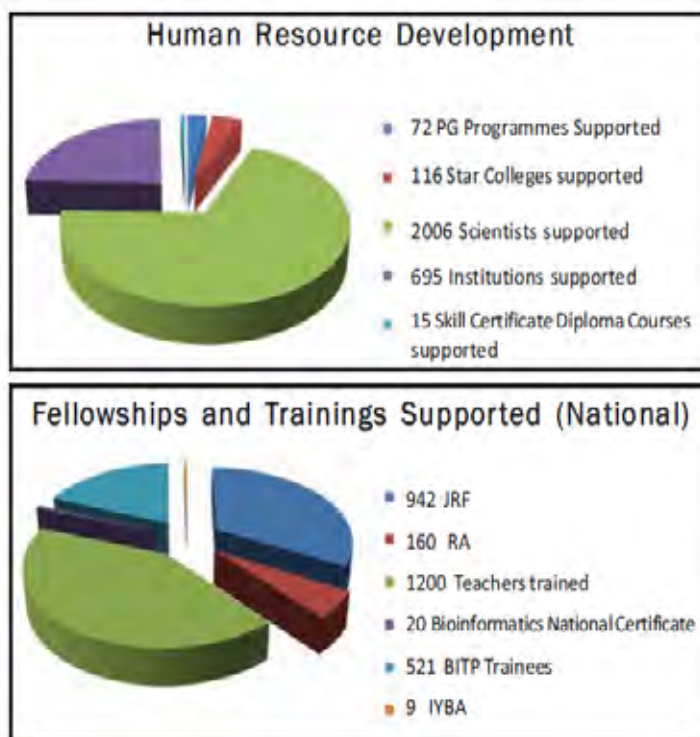
Department is providing fellowships to biotechnology students for pursuing doctoral research in universities and / or research institutions in the country. The programme is being coordinated by BCIL, New Delhi. During the year, a total 7385 applications were received, 6217 students appeared for the online exam and 293 students selected under category- I and 116 students in Category-II. A total of 829 ongoing students and 113 newly joined students are availing Fellowship under DBT-JRF program in 2018-19.

(i i) DBT Research Associateship (DBT- RA) Programme:

During the year 2018-19, in response to two advertisements, a total 864 applications were received and 98 candidates were selected for award of DBT-RA fellowship. A total number of 157 RAs are being supported during 2018-19.

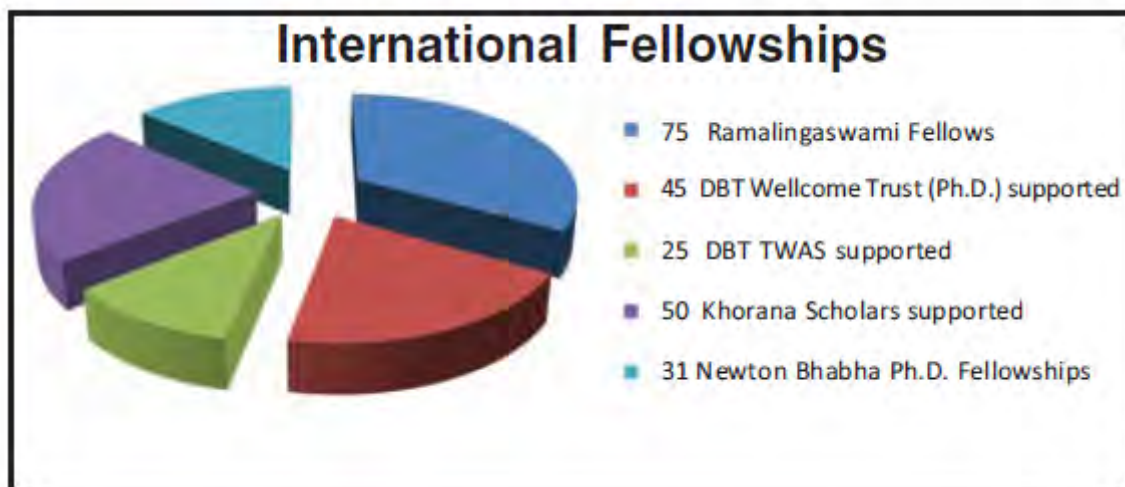
(i i i) Bioinformatics National Certification (BINC)Exam:

This year, 1037 applications have been received and total 600 students appeared in exam for Paper I. 28 students have qualified the Paper I and appeared in Paper II and Paper III. The BINC exam was conducted at 12 places in the country and 17 students could qualify the BINC 2018. The total number of ongoing students is 20.



International Fellowships

DBT is successfully running international collaborative programmes with a number of countries and philanthropic organisations in different areas of Biotechnology. This year, DBT has signed a Programme of Cooperation (PoC) with Swedish Governmental Agency for Innovation Systems (Vinnova), Sweden.



OTHERS:

DBT - Energy Biosciences Overseas Fellowships:

During 2018-19 four overseas fellows have availed this fellowship.

Indo-U.S. Genome Engineering/Editing Technologies Initiative (GETin) Overseas Fellowship:

The objective of program is to provide opportunity to Indian students and scientists to gain exposure and access to world class research facilities in leading US institutions, capacity building in the frontline area of Genome Engineering/Editing Technologies and building long-term R&D linkages and collaborations with US institutions/ researchers. During the year 2017-18, 5 Indian students and 5 Scientists have successfully completed the fellowships and during the current year, 5 Student Internships, 5 Overseas Fellowships and 3 Visiting Fellowships have been awarded.

DBT-Heidelberg Graduate Program on Big Data Research:

Department has implemented joint graduate programme on Big Data Research with Heidelberg University, Germany for human resources development. The programme has three components (i) 2-3 months short term summer training for 20 master students per year (ii) Joint PhD support for 10 students per year (ii) Associate young Researcher Visiting program for 4 scholars per year.

DBT TRAINING PROGRAMMES

(i) Short Term Training Programme for Mid-career Scientists and UG & PG Teachers: Department is supporting short term training program of 2-3 weeks duration for 20-25 participants for hands on exposure in emerging areas for mid career scientists and UG & PG teachers involved in Life Science and Biotechnology education and research. During the year, 7 programmes were selected by Department for support.

(i i) Biotech Industrial Training Programme:

Department of Biotechnology is supporting Biotech Industrial Training Programme (BITP) for providing hands-on training for six months to fresh B.E./B.Tech./M.Sc./M.Tech.biotechnology students. The programme is being coordinated by Biotech Consortium India Ltd., New Delhi. During the year, total 2211 applications were received, out of which 1726 candidates appeared in online test, 1135 candidates were shortlisted for second round of interview. Based on interview of 1135 candidates, 521 candidates were finally selected for industrial training. Total 114 companies were selected for imparting training. Total 362 candidates have placed in industries for training in 2018-19. Department is providing stipend of Rs.10,000/month to all selected candidates for six months period and bench fee of Rs. 50,000 to trainercompanies. Department has developed online feedback system for obtaining monthly feedback from trainees and trainer companies.

DBT AWARDS

(i) Tata Innovation Fellowship:

The Department initiated the TATA Innovation Fellowship scheme in 2006 to recognize and reward scientists upto 55 years with outstanding track record in biological sciences. Each awardee receives a fellowship @ Rs. 25,000/- per month in addition to regular salary and a contingency grant of Rs. 6.00 lakhs per annum. The duration of the fellowship is initially for three years which can be extended further by two years on a fresh appraisal. From its inception, 57 scientists have been awarded the fellowship till March 31, 2018. Total 5 fellowship awarded during 2018-19

(i i) Bioenergy-Awards for Cutting Edge Research

(B- ACER): Internships/ Fellowships at respective U.S. Universities. So far 17 Interns and 13 Fellows have been benefited from this Program including training for 7 Interns and 3 Fellows during 2019.

(i i i) Indian Biological Engineering Competition (iBEC) PRE- iGEM Competition: was launched in 2016

by Department in order to select and support best Indian student teams to participate in international contest iGEM competition (International Genetic Engineered Machine) which is held every year in Boston, USA. So far, Department has supported 5 team (25) team from various institute like IITs, IISER, IISc and Public/Private Colleges/Universities. In February, 2018, Pre-iGEM (iBEC) competition was announced by Department and in response, a total of 19 proposals were received and 5 teams of total 25 students were selected for consumable, registration and travel of INR 10 lakhs/ team to travel to Boston, USA to participate in iGEM 2018 held in October, 2018.

(iv) Innovative Young Biotechnologist Award (IYBA): The awards are conferred to scientists below the 35 years of age subject to certain relaxations in cases of women, OBC, SC/ST and physically challenged. Scientists on a soft positions are also eligible to apply. The award carries a fellowship of Rs.1.00 Lakh/annum for candidates who are in permanent faculty position and Rs.75000/- per month for those candidates who do not have a regular faculty position along with a

project grant to pursue their research. In the last five years, DBT has awarded fifty two young scientists under this scheme. During the year, 9 candidates were selected for the award.

(v) National Bioscience Award for Career

Development: National Bioscience Award for Career Development is conferred in recognition of outstanding contributions of scientists below 45 years of age. A maximum of 10 awards are conferred every year. Each Award carries a cash prize of Rs 2.00 lakh, a citation and trophy along with project research grant of Rs 15.00 lakhs (Rs.5.00 lakhs/year) for a period of 3 years. During 2017-18 & 2018-19 a total of 15 awardees were selected.

(vi) National Women Bioscientist Award: The Department recognizes the contributions of senior and young women scientists in the country who are working in the areas of biology and biotechnology. Each award carries a cash prize of Rs 1.00 lakh with citation and a gold medal and Research Grant of Rs 5.00 lakhs per annum for a period of 5 years. Two scientists under senior category and four scientists under junior category were selected for 2017-18 & 2018-19).

(vi i) Biotech Product, Process Development and Commercialization Award:

The aim of this award is to recognize scientists/innovators/entrepreneurs/institutions/companies both in public as well as private sector who are working towards development and commercialization of process/technology/product in the areas of modern biology and biotechnology. Upto five awards are given every year. Each award carries a cash prize of Rs. 2.00 lakh along with a citation and trophy, however, if the product is commercialized and has much higher utility, cash award of Rs.5.00 lakh is given to the awardee. The award is given in an individual category as well as under institutional category. During the year, three awards with a cash prize of Rs.2.00 lakhs each were conferred on Technology Day i.e., on 11th May, 2018 by Hon'ble Minister of Science & Technology and Earth Sciences, Dr. Harsh Vardhan.

(viii) Biotechnology Social Development Awards-2017-18:

The Department has conferred Biotechnology Social Development Award for 2017-18 to M.S. Swaminathan Research Foundation (MSSRF), Chennai in organisation category for the landmark achievement of MSSRF in implementation of programmes and projects in 10 villages in Wayanad district of Kerala since 1997 which has now spread in more than 80 villages benefitting more than 2200 families.

ix) Distinguished Biotechnology Research Professorship Award: The Department has instituted Distinguished Biotechnology Research Professorship Award Scheme to utilize the expertise of superannuated distinguished scientists, who are still scientifically active and capable of making significant research contribution in biological sciences, biotechnology and related fields.

(x) Young Entrepreneur Scheme-India (Yes-India) Programme: ABE organizes the Biotechnology Entrepreneurship Students Team (BEST); an annual flagship program supported by the Department of Biotechnology. The mandate and goal of the program is to encourage the budding entrepreneurship talents of college students.

The poster for the 4th India International Science Festival 2018 features a central graphic with a gear and a globe, surrounded by various scientific and educational icons. The text on the poster includes the title '4th India International Science Festival', the theme 'SCIENCE FOR TRANSFORMATION', the dates '05-08 OCTOBER 2018', and the venue 'Indira Gandhi Pratishthan, Lucknow'. A 'REGISTRATION OPEN' button is also present. The poster is divided into several sections, each with a small image and a caption:

- Foreign Science & Technology Ministers' Conclave
- Global Indian Science & Technology Stakeholders Meet (GIST)
- National Social Organisation & Institution Meet (NSOIM)
- Women Scientist & Entrepreneur's conclave (WSE)
- Green Good Deeds
- Health Conclave
- Young Scientists' Conference (YSC)
- Students Science Village: Reaching the Unreached
- National Science Teachers' Congress (NSTC)
- Industry Academia Meet
- Clean Air Campaign
- Agriculture Conclave

PROGRAMS FOR POPULARIZATION & PROMOTION OF BIOTECHNOLOGY

(i) DBT-CTEP Program:

To popularize Biotechnology activities in India, the Department provides financial assistance towards organizing Conference, Seminar, Symposium, Workshop and Travel support to the researchers for presenting their papers in the conferences which are being organised outside the country. It also extends support for organising DBT stalls in international and national exhibitions.

(ii) India International Science Festival 2018 (IISF 2018):

The Department in association with Department of Science & Technology and Ministry of Earth Sciences organized India International Science Festival from 5th to 8th October, 2018 at Lucknow, Uttar Pradesh. The 4th India International Science Festival 2018 was inaugurated by the Hon'ble president of India President of India, Shri Ram Nath Kovind at a function held at Indira Gandhi Pratishthan, Lucknow.

(iii) Participation in BIO International Convention

2018: The participation of Team India at BIO 2018 in Boston was supported by the Ministry of Science & Technology through the Department of Biotechnology. The Indian team had about 90 members and included officials and scientists from Central and the State Government departments and agencies. Besides the DBT and BIRAC, CSIR participated for the first time. Andhra Pradesh and Karnataka states also put up their stalls. 18 start-ups and 2 companies exhibited.

DBT IN RESEARCH AND DEVELOPMENT

This section detailed application of biotechnology tools and techniques in agriculture and allied areas including crops, livestock and fisheries. In general, the advanced molecular biological techniques, omics, genomic based selection and /or development of molecular markers for selection of improved breeds for different traits, genetic engineering are employed. The department provides support for various schemes such as R&D, translational research, product development and its validation and demonstration in collaboration with universities, research institutions and non-profit research organization as well as private sector. Collaboration with ICAR, ICMR, CSIR, DST and DoD and their institutions is integral part of implementation. The mandate of Agriculture Biotechnology program is knowledge generation, technology and product development for productivity gains, enhanced nutrition and ensuring quality, resistance to drought salinity, high temperature, resistance to pests and diseases, input use efficiency, climate resilience and bio-safety.

Crop	Varieties Developed	Traits
Rice	Pusa Basmati 1728, Pusa Basmati 1718	Bacterial blight resistant
	CARI Dhan 6 CARI Dhan 7	
	Improved White Ponni.	Drought tolerant and heat resistant
	Mushk Budji (improved)	Blast resistant variety
	HPR2143 (improved)	Blast and bacterial leaf blight resistant
	DRR Dhan-50	Two-in-one flood and drought tolerant
Wheat	Unnat PBW343	Resistance against leaf and stripe rust
Maize	HQPM1 (improved)	Pro-vitamin A rich variety
Pearl millet	TNMG 0608053 & TNBG 0608207	High grain yield and high beta carotene content
Soybean	CO3 (Soybean I) & JSS 35 (Soybean M) Improved	Phytophthora and Powdery mildew resistance
	NRC127	Kunitz trypsin inhibitor free
Tomato	Punjab Chuhhara (improved)	Leaf curl virus, late blight & root knot nematode (Mi) resistance
Grape	H90.24 and H98.23	Downy mildew resistance with bold berries and loose bunches

Table: Crops released during this year.

ANIMAL BIOTECHNOLOGY

Overall objective of Animal Biotechnology program is to enhance livestock production and productivity and improve animal health through biotechnological approaches. The broad areas of research are cattle genomics, reproduction, transgenics, cloning, animal nutrition, animal by-products, animal vaccines diagnostics and therapeutics.

List of products developed

S.N.	Products developed	Use
1.	Low passage High titer CPV-2b vaccine	Parvo virus Vaccine for dogs
2.	Attenuated Theileria vaccine	Theileriosis vaccine for bovines
3.	Evan Syndrome Flow cytometry staining kit	Diagnostic kit for Evan syndrome for dogs
4.	Strip test to detect immune mediated hemolytic anemia	Diagnostic kit to detect anemia in dogs
5.	Canine Leptospira ELISA Ab Diagnostic Kit	Diagnostic kit to detect leptospirosis in dogs
6.	Brucella Canis ELISA Ab Diagnostic Kit	Diagnostic kit to detect brucellosis in dogs
7.	Canine Leptospira RDT Ab Diagnostic Kit	Diagnostic kit to detect leptospirosis in dogs
8.	Brucella Canis RDT Ab Diagnostic Kit	Diagnostic kit to detect brucellosis in dogs
9.	Canine Parvo RDT Ab Diagnostic Kit (Fig. 2e)	Diagnostic kit to detect parvo virus disease in dogs
10.	Enteric coated polymer probiotic beads	Probiotic for poultry

AQUACULTURE AND MARINE BIOTECHNOLOGY

S. No. Details of scientific leads under aquaculture and marine biotechnology programme

1. Establishing Tachyplesin as anti-mycobacterial peptide
2. Development of conjugation strategy for Tachyplesin-drug conjugate for anti-cancer drug delivery
3. LAMP based kit for rapid and sensitive detection of pathogenic *V. parahaemolyticus* in direct seafood samples
4. Colony hybridization for accurate enumeration of both total and pathogenic *V. parahaemolyticus*
5. Standardized protocol for *L. rohita* muscle tissue for various pH range and obtained 657 unique protein
6. Standardized protocol for all the 17 tissues for pH 8 sample buffer
7. Triploidy induction in rainbow trout by heat shock
8. Pelleted diets containing seeds and leaves of *Achyranthes aspera* have been formulated for carp and magur.
9. Two new prototypes of column based filtration unit designed for extraction and purification of high value pigment Phycocyanin from *Spirulina platensis*.
10. A low-cost growth medium developed for reducing the cost of biomass production.
11. A new water filtration device designed and tested for chlorine/ ozone/UV treatment free water decontamination. The water decontaminated through this device is used for *Spirulina* biomass production.
12. New prototype of portable *Spirulina* culture unit with integrated tubular component is designed.
13. New cell lines were developed from Mozambique tilapia and cold-water fish, *Oncorhynchus mykiss*.
14. New strain of WSSV was isolated and developed PCR protocol to differentiate old and new strains of WSSV
15. An antiviral compound against WSSV from plant was isolated and identified.
16. LFIA kit for WSSV, Mr NV and IMNV.
17. Bacterial cellulose based Paper points for use in endodontics.
18. Identified the chemical structures of four novel antimalarials derived from marine organisms.

BIOENERGY, BIORESOURCES AND ENVIRONMENT

Department of Biotechnology has been implementing programs on RD & D for Biofuel technology development recognizing the need for clean and renewable energy for transportation. Government of India has announced new policy on Biofuels and an indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel is proposed by 2030. Department has made significant R&D efforts in this direction, major focus has been on development of 2nd Generation Biofuels. Overall aim of DBT is to make available cost effective biofuel technology by improving feedstock/developing new feedstock, improving biofuel production technologies, developing enzymes/ microorganisms for improved yield of biofuel and developing value added products from by-products etc. During the year 2018, focus has been on demonstration of technologies to convert Waste into Energy and value added products. Based on novel technologies to convert Municipal solid waste (organic fraction) into energy, 3 demonstration plants are being commissioned at Goa, Hyderabad and Mumbai. Indigenous cellulytic enzyme with good activity required for conversion of biomass to ethanol has been successfully scaled up at 5000 L fermenter. A major project for Barapullah Sewage Treatment Technology demonstration will be commissioned using Technology developed at DBTICT Centre for capacity of 1 Million Litres /Day.

Mission Innovation is a major global initiative launched during Paris Agreement in Nov. 2015 with the objective to accelerate innovation in Clean Energy to make it affordable and accessible for all. Energy Bioscience Division has been promoting innovative research in Biofuel area through Centre of Excellence, Extramural projects and Fellowship schemes. Capabilities developed in Systems and Synthetic Biology with demonstrated laboratory work. Department is supporting four DBT-Bioenergy Centres with specific goals and targets in accordance with the National Biofuel Policy. Recently in September 2018, 5th Bioenergy Centre has been set up at TERI with 3 other partner institutions (IITG, IARI and Transtech Green Power Private Limited) which would focus on integrated production of advanced Biofuels and Bio-commodities.

Bioenergy at a glance in year 2018-19

- Based on 2G Ethanol technology developed by DBTICT Bioenergy Centre, a plant of 100 KLD ethanol capacity will be set up at Bhatinda. Trials run and technology transfer under progress.
- Indigenous Cellulytic Enzyme has been developed and tested with industry. Scale up under process.
- India's first continuous Steam Explosion pilot plant & Extractor system for pre-treatment of Biomass has been installed at DBT-IOC Center Faridabad.
- Three demonstration plants are being set up to convert Municipal Solid Waste into Energy with suitable collaborating partner.
- Sewage water treatment with generation of energy demonstrated using microalgae photo bioreactor based technology. A demo plant is being commissioned at BPCL Colony
- Based on Carbon Capture Technology a sewage treatment plant of capacity 1 Million Liquid per day will be set up at Barapullah, New Delhi.

ENVIRONMENTAL BIOTECHNOLOGY

Environmental Biotechnology programme is one of the areas where impetus is on waste management and environmental improvement. Focus has been on development of microbial technologies for environmental improvement, development of treatment process of industrial effluent, bioremediation of xenobiotic compounds, etc. Scanning of the microbial diversity of various environments and deciphering their genetic information was also carried out with the aim of isolating microorganisms that could be in bioremediation processes.

Indian Bioresource Information Network (IBIN):

Indian Bioresource Information Network (IBIN) has been launched as a single window gateway to access distributed bioresource database available in the country to offer spatial and non-spatial services on diverse domains of bio-resources and biodiversity. It is a de-centralized bio-resource database based on distributed architecture. It works on the principle of spatial data infrastructure wherein distributed databases available across the country are accessed through one single window gateway. It provides spatial datasets on biodiversity from IIRS (ISRO) and species datasets from University of Agricultural Sciences (UAS), Bangalore as core data nodes of IBIN.

National Certification System for Tissue Culture Raised Plants (NCS-TCP):

Production of quality planting material National Certification System for Tissue Culture Raised Plants (NCS-TCP) has been established by the Department of Biotechnology (DBT), Govt. of India as per the Gazette of India Notification under the Seeds Act 1966. The major objective of NCS-TCP is to facilitate production and distribution quality planting materials. To achieve the above objectives, tissue culture companies are given recognition on the basis of infrastructure and implementation of quality management system. Apart from recognition of tissue culture companies, test laboratories have also accredited under this program. After recognition, tissue culture companies become eligible to get their tissue culture raised plants tested and certified by these Accredited Test Laboratories (ATLs). Two Referral Centers have also been identified for testing of disputed samples, training etc.

HEALTHCARE AND MEDICAL

Leveraging its focus on affordable healthcare for all, the Department is working towards prevention, detection and treatment of various diseases. The Department has funded numerous projects for developing new affordable health care interventions for prevention and treatment of diseases, creating healthcare delivery systems and developing important products of high medicinal value. The emphasis of the Department is on development of vaccines; diagnostics; affordable devices to detect and manage diseases as well as patient care and generating solutions for diseases; infectious disease biology; chronic disease biology; cancer biology; neuroscience; human genetics and genome analysis; maternal and child health; public health and nutrition; stem cells and regenerative medicine. DBT has been a front runner in reaching low cost vaccines to people and has been instrumental in levitating India to become a leader in vaccine development and manufacturing.

International Cancer Genome Consortium

With the objective of obtaining a comprehensive description of the genetic basis of human cancer, a multi-country project - called the "International Cancer Genome Consortium Project" - has been initiated. Specifically, the project aims to identify and characterize all the sites of genomic alteration associated at significant frequency with all major types of cancers.

STEM CELLS AND REGENERATIVE MEDICINE

Keeping in view the therapeutic potential of these cells, the Department continues to support research and training in this important area of Medical Biotechnology. The overall aim is to promote basic, early and late translational research in the area of stem cell and regenerative medicine. Broadly the focus is on induced pluripotent stem cells; hematopoietic stem cells; mesenchymal stem cells and human embryonic stem cells. Scientific strategies includes basic biology of all adult stem cells, early and late translational research, developing gene editing technology for possible therapeutic applications, creation of animal models for various human diseases and training programs on various component of stem cells and regenerative medicine. In addition, the Department has also set up infrastructure at identified institutions to promote research in this area. The Department has set up an institute, 'The Institute for Stem Cell Science & Regenerative Medicine', (Instem) at Bengaluru with Centre for Stem Cell Research (CSCR) as its translational unit at CMC, Vellore, with the intention of using stem cell science for understanding human diseases and development of stem cell-based therapies. A Centre of Excellence has been supported at AIIMS, New Delhi with Good Manufacturing Practices (GMP) Facility for manufacturing stem cells of clinical grade for patient use.

VACCINE RESEARCH AND DEVELOPMENT

Leads in Vaccine Development:

- Malaria Vaccine: Vaccine for falciparum malaria is under toxicology assessment (JAIVAC 2) and vaccine for vivax malaria has completed phase I trial (JAIVAC1).
- Dengue Vaccine: The International Centre for Genetic Engineering and Biotechnology (ICGEB) drug major Sun Pharma are partnering to use the recombinant EDIII- based sub-unit dengue vaccine candidate to develop an injectible vaccine that protects against all four dengue strains are endemic to India. The team is presently optimizing the production process and are expected to initiate clinical trial in the near future. Also a live attenuated Dengue Vaccine candidate licensed from NIH is being supported under the National Biopharma Mission. Development of Chikungunya, Influenza, and Cholera vaccine candidates are also being supported.

NATIONAL BIOPHARMA MISSION

The National Biopharma Mission was formally launched by Hon'ble Minister for Science & Technology on 30th June, 2017 and the legal agreement with World Bank for flexible financing arrangements for this Mission of DBT was executed on April 24, 2018. The Mission aims to make India a hub for design and development of novel, affordable and effective biopharmaceutical products for combating public health concerns. It would strengthen translational capability of academic researchers; empower bio-entrepreneurs and SMEs by decreasing the cost and risk during early stages of product development and also elevate the innovation quotient of the industry.

GLUE GRANT SCHEME

Glue Grant scheme was initiated aiming to link Basic, Clinical and Public Health Research Departments in an inter-institutional linkage(s) leading to long-term partnership programs to bridge the gap between laboratory/field research and its application to clinical and policy outcomes with a potential for translational research and technological innovation and capacity building efforts. During the second phase, three projects have been implemented under this scheme.

NANOBIOTECHNOLOGY

DBT has been engaged in advancing research and promoting innovation to address various issues related to health, energy, agriculture and environment through nanotechnology interventions. Major thrust areas include development of novel formulation of existing drugs to enhance their efficacy, smart nano-materials for tissue and cellular organelle specific delivery vehicles and tissue engineering, new therapeutics for important chronic and infectious diseases, sensors for detection of disease biomarkers. Emphasis has also been given to promote Regulatory Science research and help commercialization of Nano-enabled products.

Salient Achievements

A new tannery solid waste management approach was developed by converting the limed fleshings into sound absorbing nanofibers. The nanofibers showed viability of around 95 % and were also found support adhesion and spreading of fibroblasts.

Novel Herbal Mosquito Repellent using Nanofibers with enhanced surface-to-volume ratio, high porosity was developed. The

developed patch provided controlled release of essential oils for longer period of time for indoor and outdoor protection of day and night from mosquitoes. The technology was transferred to SJK Pharmacy, Rohtakon.

At IISc Bangalore, researchers have developed a high throughput microfluidic device with nano-scale liquid-air interfaces to investigate the mechanical response of erythrocytes under diabetic conditions IIT Guwahati has developed a micro-architecture of bone using silk-bioceramics based composites through conventional scaffolding and bio-fabrication. They have Nano functionalised silk fibbers with copper doped bioactive glass and used it as reinforcements to impart osteo-inductivity.

ARTIFICIAL INTELLIGENCE

Recent advances in Artificial Intelligence have the potential to accelerate the access, affordability and quality of healthcare within the country. DBT has initiated a new Mission Program on “Artificial Intelligence application for Affordable and Accessible Healthcare-Big Data and Genomics”. During the year, the related stakeholders met to collectively define the roadmap for DBT to undertake activities in AI and Big Data. Major projects like Genome India: Cataloguing the genetic variation in Indians, Earth Bio-genome on sequencing, analyzing, annotating and interpreting 1000 medicinal plants in India and some pilot studies for taking prototypes for diagnosis such as early screening and diagnosis of diabetic retinopathy, screening of breast cancer and cardiovascular diagnosis are being discussed.

KNOWLEDGE GENERATION

During the year, more than 150 R&D projects were supported. R&D support to the basic biology research resulted into more than eighty research publications and two patents.

Basic Research is a core strength in all disciplines of life sciences to address various issues in Modern Biology. Integration of recombinant technology and process design, as well as in-silico modelling and process systems engineering for efficient Bio-processes development and manipulation of Bio-systems through metabolic engineering techniques is being attempted to provide novel enzymes, pathways and cells. Further, the department has emphasised on Bioinformatics, Computational Biology, Big Data, Nanobiotechnology and Genome Editing Technologies. These emerging and predicted future biotechnologies which are impacting on the life sciences speedily. These tools and technologies have far-reaching applications which impinge on every aspect of human existence. Highlights of scientific outcome during the year are as follows:

- Establishment of Large Scale Polymer particle laboratory at National Institute of Immunology (NII), New Delhi
- Identification of a new cellular role for D-amino acyltRNAdeacylase (DTD) in clearing glycine mischarged on tRNA(Ala)
- First report of SATB1 and SATB2 interaction and regulation of each other in reciprocal manner
- Identification of Vgl1 as an essential factor for heterochromatin integrity
- Three isoforms of Rab5 are regulated by three different transcription factors are demonstrated for the first time
- Distinction between polyadenylation in bacteria and eukaryotes is demonstrated
- Three plasmids are designed for overexpression of Proteins

DeLCON (DBT's e-library Consortium)

DBT's Electronic Library Consortium (DeLCON) is a topical endeavor for providing access to scholarly electronic resources including full-text and bibliographic databases in all the life science disciplines to the DBT Institutional community across the country. At present, the total members of DeLCON Consortium are 33 Institution, comprising of DBT Institutions and some institutions and universities across the states in North Eastern India. DeLCON provides current as well as archival access to more than 1000+ core peerreviewed biology and biotechnology journals and a bibliographic database (SCOPUS) in different disciplines from 22 overseas publishers and aggregators.

RESEARCH RESOURCES, SERVICE FACILITIES AND PLATFORMS (RRSFP)

The RRSFP program is to promote, upgrade and for establishment of new biotech facilities/infrastructure viz. animal house; gene banks; repositories for microbes, plants, model organisms and infectious organisms; towards augmentation of research activities of scientific community at regional, national and international level. Furthermore, it is aimed to promote growth of life science and biotechnology in the university system and linking research to education at every opportunity through creation/reengineering/

remodeling/up-gradation of life science departments in central/state universities.

SAHAJ

The Department of Biotechnology has launched its research resources and facilities supported across the country, through a portal 'Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration, (SAHAJ)'. Each Autonomous Institute and DBT supported Infrastructure programmes will provide and share its equipment and infrastructure to Research Institutes, Universities, Colleges and Start-ups /Entrepreneurs. Their website will carry infrastructure facility usage forms with well defined usage charges, and terms and conditions.

BIOTECH FACILITIES

The mandate of the program is to promote, upgrade and establish new biotech facilities/infrastructure viz. Animal house, gene banks, repositories for microbes, plants, model organisms and infectious organisms; towards augmentation of research activities of scientific community at regional, national and international level. Further, the program is designed to promote growth of Life Science and Biotechnology in the university system and linking research to education at every opportunity through creation/reengineering/ remodeling/up-gradation of life science departments in central/state universities. The outcome of the research activities supported for strengthening the research infrastructure in Universities and Institutions are detailed below:

"Flow Cytometry and Imaging Facility" at ILS Bhubaneswar has been supported for Sorting Flow Cytometer, Confocal Microscopy and HTS imager.

The National Cryoelectron Microscopy Facility has been installed at Bangalore Biocluster (B-Life) and officially inaugurated by Prof. CNR Rao and Dr. Richard Henderson (Nobel Prize winner for Chemistry in 2017) on 25th January, 2018.

Advanced Technology Platform Centre, Regional Centre for Biotechnology

The Advanced Technology Platforms Centre (ATPC) was conceived with the aim of providing access to cutting-edge technologies to researchers across India. Thus far, the Flow Cytometry Facility, Protein Expression and Purification Facility, Mass Spectrometry Facility, Molecular Interactions Facility and Optical Microscopy have been established at this centre. Facilities of ATPC are being utilized by the Scientists from THSTI, Faridabad; ICGEB, New Delhi; HAU; Vyome Biosciences, AIIMS, New Delhi; NII, New Delhi; NIPGR, New Delhi; University of Delhi; NBRC, Manesar; and IARI, New Delhi.

National Mouse Resource (NaMoR)

The Department has established a National facility for Mouse Resource & Research at NCBS & inStem, Bangalore with an aim to create a national state-of-the-art rodent facility including transgenic and knockout mouse models of human disease.

Access to Macromolecular Crystallography

Beamlines at ESRF, France A Beamline-14 Program Coordination Unit (DBT-BM14-PCU) at Regional centre for Biotechnology, Faridabad has been supported by the Department for providing access to Indian scientific community to synchrotron X-ray Beam line (BM14) in Grenoble, France.

MAKE-IN-INDIA AND STARTUP INDIA

The DBT alongwith BIRAC is playing a crucial role in the implementation and delivery of the flagship programs of the Government of India, such as 'Make-in-India' and 'Startup India'. DBT recognizes the necessity for entrepreneurship development among the youth in the country and hence has taken initiatives to build, support and promote Indian biotech ecosystem in healthcare, agriculture and industrial biotechnology.

The department BIRAC endeavors to scale up the number of Startups in the sector by nurturing approximately 300-500 new Startups each year to have around 2,000 Startups by 2020 41 Bioincubators have been setup across India with world class facilities.

1st International Incubator- Clean Energy International Incubator has been set up under Mission Innovation by DBT & BIRAC. Startups from 23 participating EU countries can potentially come & incubate in India and likewise startups from this incubator can go to the partnering countries facilitating access to global opportunities. AcE Fund and SEED fund have been launched to provide capital assistance to start-ups and act as a bridge between promoters' investment and venture/angel investors. BIRAC Regional Centers-4 regional centres and 4 Bio connect offices have been established.



FIRST (Facilitation of Innovation and Regulations for Start-ups and Innovators) HUB is created at BIRAC to resolve the queries of start-ups, entrepreneurs, researchers, academicians, incubation centres, SMEs etc. The FIRST HUB has representation from CDSCO, ICMR, DBT, BIS, NIB and BIRAC along with KIHT. It brings stakeholders to a single platform.

Impact of PPP programs: Start-up India and Make-in-India Initiatives (2018-19):

- _ No. of technologies/ products commercialised - 14
- _ No. of patents filed - 11
- _ No. of start-ups & entrepreneurs supported - 87
- _ No. of Bioincubators supported - 4
- _ Incubation space created - 57,000 sq.ft.

Biotech Science Clusters

Recognising the need for creating an enabling ecosystem for connecting university and academic researchers, national laboratories, incubators, technology management units, industries SMEs, start-ups and entrepreneurs, the concept of setting-up of Bioclusters across the country was developed as part of the National Biotechnology Development Strategy. Accordingly, four Bioclusters have been established at Faridabad, Bangalore, Kalyani and Pune.

BIOTECHNOLOGY PARKS & INCUBATORS

The Department of Biotechnology has established Biotechnology Parks/Incubators across the country to translate research into products and services by providing necessary infrastructure support. These Biotechnology Parks offer facilities to Scientists, and

Small and Medium sized Enterprises (SMEs) for technology incubation, technology demonstration and pilot plant studies for accelerated commercial development. The Department so far, has supported 9 Biotechnology Parks in various States. These are:

- i) Biotech Park, Lucknow, Uttar Pradesh;
- ii) Biotechnology Incubation Centre, Hyderabad, Telangana;
- iii) Tidco Centre For Life Sciences (TICEL) Biotech Park, Chennai, Tamil Nadu;
- iv) The Golden Jubilee Biotech Park For Women, Chennai, Tamil Nadu;
- v) Biotech Park Technology Incubation Centre, Guwahati, Assam; vi) Biotechnology Incubation Centre, Cochin, Kerala;
- vii) Biotechnology Park, Bangalore, Karnataka;
- viii) Industrial Biotechnology Parks (IBTPs), Jammu & Kashmir;
- ix) Chhattisgarh Biotech Park, Naya Raipur, Chhattisgarh.



Biotech Park, Lucknow

NCR-Biotech Science Cluster, Department of Biotechnology



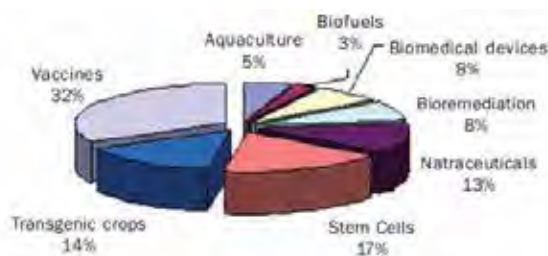
INTERNATIONAL COLLABORATION

The Government of India is increasingly trying to focus and promote collaborative research to solve a myriad of socio-economic as well as environmental challenges, which will have footprint on generations to come. The Department is implementing many such international collaborative programmes and the highlights of the achievements are as follows:

- India-UK Cancer Research Initiative
- Programme of Cooperation with Sweden
- Programme of Cooperation with Denmark
- Programme of Cooperation United States of America

Country	No. of Projects			Total
	Ongoing	Duration yet completed	New Sanctioned	
Australia	05	50	1	57
Brazil	06	0	0	06
Canada	17	0	0	17
Denmark	06	05	0	11
EU	08	22	0	30
Finland	06	17	0	23
Germany	08	03	0	11
Netherlands	06	0	4	10
Russia	04	0	0	04
Spain	05	03	1	09
Sweden	07	09	0	16
UK	27	23	13	63

Country-wise summary of projects under international partnerships:



Areawise distribution of funded projects

1. Number of joint publications	800
2. Number of patents	48
3. Number of technologies	11

Consolidated outcomes through international partnerships – At a glance

PROMOTING WOMEN SCIENTISTS - SCIENCE FOR WOMEN - WOMEN FOR SCIENCE

Biotechnology Career Advancement and Reorientation Programme (BioCARE): A Mission Programme of the Department for empowering Women Scientists of India There are two categories under which support is provided for a period of 3 years. There is a Research Grant Opportunity (RGO), under which a research grant upto Rs. 60.00 lakhs is provided. Under this category, the women Scientists who are unemployed are provided monthly emoluments ranging from Rs. 50,000/- to 60,000/- p.m. The employed women Scientists in addition to salary get an amount of Rs.10,000/- p.m as an incentive. Under the Early Career Scientists (ECS) category, scientists having experience less than two years post PhD are eligible to apply for research grant of upto Rs. 40.00 lakhs. The unemployed women scientists are provided a monthly emolument of Rs. 50,000/-.

Women Scientists supported so far- Employed/Unemployed

Sl. No	Year of sanction	Employed	Unemployed	Total
1.	2011-12	17	10	27
2.	2012-13	15	17	32
3.	2013-14	29	34	63
4.	2014-15	48	36	83
5.	2015-16	6	4	10
6.	2017-18	37	64	101
	Total	150	165	315

Sl. No	Year of Sanction	25-40 yrs	41-50 yrs	51-55 yrs	Total
1.	2011-12	20	15	2	37
2.	2012-13	17	4	-	21
3.	2013-14	32	27	4	63
4.	2014-15	62	20	1	83
5.	2015-16	8	2	-	10
6.	2017-18	88	13	-	101
	Total	227	81	7	315

Age wise details of Women Scientists Supported

Programmes of Societal Relevance – Rural and SC/ST Population

The Department has been supporting projects for promotion of use of biotechnological processes and tools for the benefit of the society comprising rural, SC/ST and women community. The programme aims to create platform for self-employment generation among the target population by diffusion of proven and field-tested technologies through demonstration, training and extension activities.

The broad focused areas supported under this programme includes agriculture and animal husbandry including fish farming, poultry farming, pig production, goat farming, value added products, floriculture, hybrid seed production, integrated farming system, entrepreneurship development, bio-resource utilization, women and child health, hygiene and nutrition. More than 12,900 rural, SC/ST and women population including youth have been benefited through the implementation of these projects during the year.

PROMOTING BIOTECHNOLOGY IN NORTH EAST REGION

The North East Region (NER) of India is a treasure house of exceptional natural beauty, floral and faunal biodiversity with abundant mineral, water and forest resources. It has been identified as one of the biodiversity hotspots of the world. Rich bioresources spread across NER's diverse ecosystems and nurtured by indigenous communities, provide ample opportunities for furthering economic development of the region.

In order to give focused attention for the North Eastern Region, the Department of Biotechnology (DBT), Ministry of Science & Technology, Government of India, has earmarked 10% of its annual budget every year for promoting & strengthening biotechnology activities in the region. Towards this the DBT has also established a North Eastern Biotechnology Programme Management Cell (NER-BPMC). DBT has proactively launched several region-specific programmes through the intervention of modern biology and biotechnology in NER.

These programs are towards flagship R&D programmes, skilling of human resource, establishment of research and training infrastructure with specific network programmes targeting local problems including entrepreneurship development.

Major outcome under the NER programmes of DBT for the year 2018

Personals Trained in NER

- _ 325 students trained as JRF/SRF under Twinning Programme
- _ 292 students trained as JR/SRF/RAs under 112 Biotech Hubs in NER
- _ 34 NER Scientists awarded under Overseas Associateship for training in international laboratories

Publications

- _ 267 publications in peer-reviewed journals from Twinning, U-Excel and other major Network Projects
- _ 280 publications in peer-reviewed journals from 112 Biotech hubs

Patents filed

- _ 5 patent applications filed before the Indian Patent Office Technologies developed/licenced/commercialised
- _ 3 technologies developed under the U-Excel Scheme
- _ 2 technologies developed under the Twinning R&D programme
- _ 3 animal vaccines/ diagnostic kits developed under ADMaC project being validated by State animal Husbandry departments in NER
- _ Technology developed for breeding of 3 commercially viable fish species in NER, at CoE in Fisheries at College of Fisheries, Tripura. Scaling up with farmers under process.
- _ 4 technologies commercialized by DBT-AAU Centre, Jorhat

Entrepreneurship Development

_ Technology Incubation Centre for Entrepreneurship Development on Mushroom Culture & Farming developed at Bodoland University, Kokrajhar, Assam.

A total of 1663 people have been trained and 48 small scale entrepreneurs groomed.

Autonomous Institutions of DBT

1. CDFD	Hyderabad
2. CIAB	Mohali
3. IBSD	Guwahati
4. ILS	Pune
5. INSTEM	Bangalore
6. NABI	Mohali
7. NBRC	Gurugram
8. NCCS	Pune
9. NIAB	Hyderabad
10. NIBMG	Kalyani
11. NII	Delhi
12. NIPGR	Delhi
13. RCB	Kolkata
14. RGCB	Trivandrum
15. THSTI	Delhi
16. NCBS	Bangalore



Public Sector Undertakings

Bharat Immunological and Biologicals Corporation Limited:

One of the the public sector units, Bharat Immunological and Biologicals Corporation Limited (BIBCOL) was entrusted with manufacture of Oral Polio Vaccines and with continued support from the Department, played a significant role in polio eradication in our country.

Indian Vaccines Corporation Limited

Indian Vaccines Corporation Limited was incorporated in March 1989 as a Joint Venture Company promoted by Govt. of India (Department of Biotechnology), Pasteur Merieux Serum & Vaccines (PMSV), France and Indian Petrochemicals Corporation Limited. The company came into existence after a joint venture was signed on 1st February 1989 between Reliance Industries Limited and PMSV.

Biotechnology Industry Research Assistance Council:

In order to promote Public-Private Partnership (PPP) to nurture the emerging biotech enterprises in the country. Biotechnology Industry Research Assistance Council (BIRAC) is a not-for-profit Section 8, Schedule B, Public Sector Enterprise, set up by the Department of Biotechnology (DBT), Government of India as an interface agency to strengthen and empower the emerging Biotech enterprises specially the start-ups and SME's to undertake the strategic research and innovation, addressing nationally relevant product development needs.

BIRAC provides funding support to entrepreneurs, start-ups, SMEs and Biotech Companies for all stages of the product development value chain from discovery to proof of concept to early and late stage development, taking forward to its validation and scale up, and then right up to pre-commercialization.



REGULATION AND INTELLECTUAL PROPERTY

The programme on Biosafety Research and Regulations emphasizes on the implementation of the provisions of Rules, 1989 of Environment (Protection) Act, 1986 for the manufacture, use, import, export and storage of hazardous microorganisms, genetically engineered organisms or cells and products thereof in research and development. The Rules, 1989 delegated the Department to administer the functioning of

- i) Institutional Biosafety committees (IBSCs) which operate directly from the premises of the institutions and ensures on-site assessment and monitoring of adherence to the biosafety guidelines with overall oversight of the regulatory process, at the institutional level and
- ii) Review Committee on Genetic Manipulation (RCGM) which monitors & reviews all ongoing research projects involving high risk category and confined field experiments and ensure the compliance of biosafety rules & regulations.

During the year, the RCGM evaluated more than 1300 applications from public and private institutions in the areas of agriculture, healthcare and industrial products specifically for authorization to import, export & exchange of high risk group microorganisms and recombinant DNA research (rDNA) related materials including seeds, gene constructs, plasmids, vectors and genetically engineered (GE)/living modified (LM) organisms; to conduct pre-clinical toxicity studies; for evaluation of pre-clinical study reports; to conduct confined field trials on GE crops viz. cotton, corn, rice etc. for generation of biosafety data; and to conduct rDNA research in pharmaceutical & agriculture sectors.

During the year under report, 12 rDNA products were permitted by RCGM for conducting pre-clinical toxicity studies by 8 private/public institutions/companies. Based on the evaluation of pre-clinical study reports, 11 rDNA products were recommended to Drug Controller General of India [DCG(I)] for appropriate phase of human clinical trials.

The Department had communicated Input/output norms for 07 biotechnological products. Comments on export/import of 05 restricted items were also shared with Directorate General of Foreign Trade (DGFT) to facilitate trade in biotechnology.

The Biotechnology Patent Facilitating Cell (BPFC) provides single window awareness-cum-Patent facilitation to scientists and researchers for filing of Patent Co-operation Treaty (PCT) and National phase applications on inventions pertaining to Life Sciences and Biotechnology through empaneled IPR firms. During the period under report, 5 new patent applications were filed and 6 Indian patents and one US patent have been granted /out of the applications filed earlier.

Details of Actual Expenditure during 2017-18, B.E. and R.E. of 2018-19

(Rs. in crores)

SL No.	Name of the Programme/Scheme	Actual 2017-18	BE 2018-19	RE 2018-19	BE 2019-20
1	2	3	4	5	
	REVENUE SECTION				
1	Secretariat Economic Services				
1.01	Secretariat	26.86	32.31	31.61	32.31
2.01	Biotechnology Industry Research Assistance Concl (BIRAC)	30.00	31.00	31.00	31.00
2.02	Support to Autonomous R&D Institutions*	724.51	748.98	749.68	761.86
3.01	Biotechnology Research and Development, Human Resource Development & Research Resources Facilities	1239.11	1350.00	1350.00	1474.97
4.01	Industrial and Entrepreneurship Development	210.94	249.24	249.24	280.20
	TOTAL	2231.42	2411.53	2411.53	2580.34

Table: DBT Annual Budget

Article compiled by Kamal Pratap Singh, Managing Editor, Biotech Express

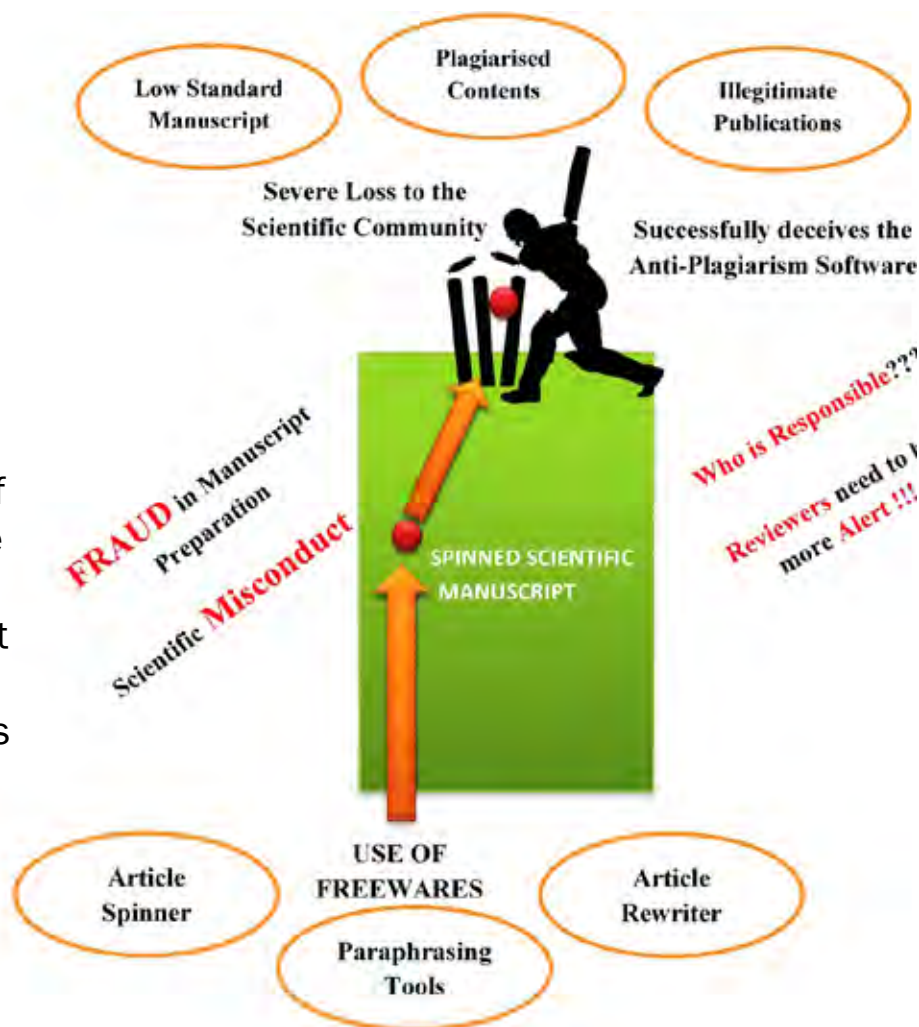
Note: The information included in this article has been taken from DBT Annual report 2018-19 which was released recently and is available online on DBT, India website. The author has tried to include and show only the most recent and important information, however writer advise readers to see the original report for full information.

Editorial

SPIN to WIN the Battle of Publications: Recent Trends of Scientific Fraud and Misconduct in Manuscript Preparation

Pratyush Kumar Das, Editorial Board Member, Biotech Express Magazine

In the world of Cricket, talismanic bowlers like Shane Warne, Anil Kumble, Harbhajan Singh, MuttiahMuralitharan, RavichandranAshwin, Bhagwat Chandrasekhar, Bishan Singh Bedi, SaqlainMushtaq are some of the notable names that have brought accolade for their country. Their peerless talent to spin the leather ball and breakthrough the opponent's defences is incredible. However, shockingly the trick of spin is starting to get familiar and commonly practised in the field of scientific publications.



Nowadays journal publications have become a major factor in analysing the research output of an individual. In the current scenario of “Publish or Perish”, there seems to be a battle to achieve high publication numbers amongst researchers worldwide. In a quest to achieve maximum publications in a short span of time, some of the researchers have started adopting the trick of “SPIN”. In this case, there is no requirement of specific talent as all the things are executed with the help of freely available software’s on the web. The researcher only needs to know what he/she has to copy and from where.

As far as the publication ethics are concerned, copying someone’s other work is considered as malpractice and termed as “*Plagiarism*”. Even copying multiple lines or paragraphs from a single source is considered as unethical irrespective of whether you cite the author(s) of the source or not. But, what if you copy someone else’s words in length and convert it to make it look completely original, generally referred as “*Paraphrasing*”. This trend of falsification is slowly engulfing the research world. Thanks to the numerous free software’s available on the web.

The softwares mostly can be found in the name of *Article spinner*, *Article rewriter*, *Paraphrasing tools* and so on. Many of the researchers are widely using such software for evading the restrictions posed by journals and scientific regulatory bodies to curb plagiarism. These software’s take the required texts as input and then substitute different words with their synonyms to provide the output with zero similarity. However, in the process they sometimes completely jumble up the meaning of the sentences and scientific words thereby causing confusion in the mind of the readers leading to misinterpretation. Moreover, over-dependence on such software’s further declines the writing and reasoning ability of a researcher dealing severe loss to the scientific community.

When I heard about this, at the first instance I was not ready at all to believe the same. It seemed to me as if like some kind of a joke. This made me to try it for once and the results I got was indeed

shocking. For the purpose I took one of my already published article entitled – “Phytoremediation and Nanoremediation: Emerging Techniques for Treatment of Acid Mine Drainage Water” published in the April 2018 issue of *Defence Life Science* journal (DOI: 10.14429/dlsj.3.11346). I took the first page of the article and used the online freeware – “Free Article Spinner”. The output received from the software was analysed for similarity using “Plagiarism Checker” (A free online plagiarism detector) as well as an advanced similarity checker “TURNIT IN”. Both the software’s were unable to detect any kind of similarity (0% similarity) (Refer Inset Images 1 and 2). However, the changes made by the software to the original text were quite disheartening and seemed unscientific at many places.

Being a reviewer and member of the advisory board of many journals, I receive number of papers (articles) for evaluation each and every month. This is where I notice such practices quite often and it obviously hurts me a lot. One in every four articles has such kind of issues and it almost becomes impossible to make a thorough reading. It is always important the way an author presents a manuscript (proper use of language, grammar, clarity of text and images etc.).

Spinning articles and converting them to one’s own writing may evade the anti-plagiarism barrier but in turn makes the manuscript quite uninteresting, confusing and sometimes even irritating. It becomes quite a tedious task on part of a reviewer to evaluate such manuscripts and as such pose higher probability of getting rejected.

These software’s take the required texts as input and then substitute different words with their synonyms to provide the output with zero similarity.

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Phytoremediation and Nanoremediation : Emerging Techniques for Treatment of Acid Mine Drainage Water

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ABSTRACT

Drainage from mining sites rich in sulfur bearing rocks is known as acid mine drainage (AMD). Acid mine drainage water is a serious environmental pollutant that has its ill effects on plants, animals and microflora of a region. Mine water drainage mainly results due to anthropogenic activities like mining that leave the sulfur bearing rocks exposed. This drainage water poses as a potent soil, surface water and ground water pollutant. Although a lot of remediation measures have been implemented in the past but, none of them have been able to solve the problem completely. This review intends to focus on new emerging and better techniques in the form of phytoremediation and nanoremediation for treatment of acid mine drainage water. Besides, the review also gives more importance to the phytoremediation technique over nanoremediation because of the cost effectiveness and eco-friendly nature of the first as compared to the latter. A hypothetical model discussing the use of hyperaccumulator plants in remediation of acid mine water has been proposed. The model also proposes natural induction of the phytoremediation ability of the plants involved in the remediation process. The proposed model assisted by inputs with further research, may be helpful in proper treatment of acid mine drainage water in the near future.

Keywords: Acid mine drainage; Phytoremediation; Nanoremediation; Hyperaccumulator; Heavy metals; Pollutant; Environment

1. INTRODUCTION

Pollution of the environment especially the water bodies by drainage water coming from sites containing sulfur bearing rocks is termed as acid mine drainage (AMD), and is of major concern these days. Although AMD can occur naturally, but still, anthropogenic activities like mining and processing of metal ores and coals can contribute significantly on a large scale to the generation of the same¹. The sulfide minerals get exposed to the environment during the process of mining, resulting in generation of excess amount of acid which can have both immediate as well as long lasting hazardous effects on the environment. Acid mine drainage has continued to pose as a serious environmental threat. It is one of the major environmental issues being faced by the metal mining industry². The negative impacts of AMD include adverse effects on aquatic ecosystems of the drainage water receiving streams, corrosion of mining equipment and machineries³, degradation in the quality of soil and contamination of the groundwater by leaching of heavy metals present in the acid mine water⁴. Focus has been put on the serious hazards imposed by acid mine drainage water on the environment and the related health risks. Furthermore, efforts have been made to highlight new emerging techniques - phytoremediation and nanoremediation and their application for proper treatment of the same. A hypothetical model has been devised where in hyperaccumulator plants could be induced to increase their phytoremediation ability for efficient treatment of polluted water generated from mines.

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2. THE INDIAN SCENARIO

Acid mine drainage affected areas in India mainly fall under the region of Damodar valley coalfields and the north-east coalfields. The Damodar valley coalfields include the Jharia and West Bokaro coalfields in Jharkhand and Raniganj coalfield in the West Bengal. Among the north-eastern coalfields, the Jaintia coalfield of Meghalaya and Makum coalfield of Assam are one of the most polluted ones. Some of the heavy metals that are generally present in the mine drainage water are Iron, Copper, Manganese, Arsenic, Zinc, Lead, Chromium and Cadmium. The mine water from the Jaintia coalfield and Makum coalfield showed higher concentration of these metals as compared to other mining sites in India. The mine water from Jaintia coalfield, Jharkhand, has the highest concentration of iron, copper, zinc and lead as compared to the others⁵. The coal mines of Raniganj, West Bengal is known to have the highest arsenic content in its mine water. Similarly, the mine water released by West Bokaro coalfield in Jharkhand has the highest concentration of chromium⁶. Mine water generated from the Makum coalfield of Assam has the highest concentration of Manganese, Nickel and Cadmium and also consist the second highest concentration of Iron, Copper, Zinc and lead⁷. Details about the concentration of metals present in the discharged water of all these mines have been presented in Table 1.

3. FORMATION OF ACID MINE DRAINAGE

Acid mine drainage is produced by natural oxidation of sulfide containing minerals like Iron pyrite or Iron disulfide, when exposed to air or water. Beside natural processes, man-

Conceptual

Seepage from mining locales wealthy in sulfur bearing rocks is known as corrosive mine waste (AMD). Corrosive mine waste water is a genuine natural toxin that has its evil impacts on plants, creatures and microflora of a district. Mine water seepage primarily results because of anthropogenic exercises like mining that leave the sulfur bearing rocks uncovered. This waste water acts like an intense soil, surface water and ground water contamination. Despite the fact that a ton of remediation measures have been actualized before in any case, none of them have had the option to take care of the issue totally. This audit plans to concentrate on new rising and better systems as phytoremediation and nanoremediation for treatment of corrosive mine waste water. In addition, the survey likewise gives more significance to the phytoremediation strategy over nanoremediation as a result of the cost viability and eco-accommodating nature of the first when contrasted with the last mentioned. A theoretical model talking about the utilization of hyperaccumulator plants in remediation of corrosive mine water has been proposed. The model additionally proposes regular acceptance of the phytoremediation capacity of the plants associated with the remediation procedure. The proposed model helped by contributions with further research, might be useful in legitimate treatment of corrosive mine seepage water sooner rather than later.

1. Presentation

Contamination of nature particularly the water bodies by seepage water originating from destinations containing sulfur bearing rocks is named as corrosive mine waste (AMD), and is of significant concern nowadays. In spite of the fact that AMD can happen normally, yet at the same time, anthropogenic exercises like mining and handling of metal minerals and coals can contribute essentially on a huge scale to the age of the same¹. The sulfide minerals get presented to the earth during the way toward mining, bringing about age of overabundance measure of corrosive which can have both quick just as enduring dangerous consequences for the earth. Corrosive mine seepage has kept on acting like a genuine ecological danger. It is one of the major ecological issues being looked by the metal mining industry². The negative effects of AMD incorporate antagonistic consequences for oceanic biological systems of the seepage water accepting streams, consumption of mining hardware and machineries³, corruption in the nature of soil and tinting of the groundwater by draining of substantial metals present in the corrosive mine water⁴. Concentrate has been put on the genuine perils forced by corrosive mine waste water on nature and the related wellbeing dangers. Moreover, endeavors have been made to feature new rising methods - phytoremediation and nanoremediation and their application for legitimate treatment of the equivalent. A speculative model has been conceived where in hyperaccumulator plants could be initiated to build their phytoremediation capacity for productive treatment of dirtied water created from mines.

2. THE INDIAN SCENARIO

Corrosive mine waste influenced regions in India fundamentally falls under the locale of Damodar valley coalfields and the north-east coalfields. The Damodar valley coalfields incorporate the Jharia and West Bokaro coalfields in Jharkhand and Raniganj coalfield in the West Bengal. Among the north eastern coalfields, the Jaintia coalfield of Meghalaya and Makum coalfield of Assam are one of the most contaminated ones. A portion of the substantial metals that are commonly present in the mine seepage water are Iron, Copper, Manganese, Arsenic, Zinc, Lead, Chromium and Cadmium. The mine water from the Jaintia coalfield and Makum coalfield demonstrated higher centralization of these metals when contrasted with other mining locales in India. The mine water from Jaintia coalfield, Jharkhand, has the most astounding convergence of iron, copper, zinc and lead when contrasted with the others⁵. The coal mines of Raniganj, West Bengal is known to have the most noteworthy arsenic content in its mine water. Likewise, the mine water discharged by West Bokaro coalfield in Jharkhand has the most astounding convergence of chromium⁶. Mine water produced from the Makum coalfield of Assam has the most elevated convergence of Manganese, Nickel and Cadmium and furthermore comprise the second most noteworthy grouping of Iron, Copper, Zinc and lead⁷. Insights concerning the convergence of metals present in the released water of every one of these mines have been introduced in Table 1.

Image.1. Comparison of the original manuscript with the changed content after spinning with Free Article Spinner Software.

The image displays two screenshots of plagiarism checking software. The left screenshot is from Turnitin, showing an 'ORIGINALITY REPORT' with four categories: SIMILARITY INDEX (0%), INTERNET SOURCES (0%), PUBLICATIONS (0%), and STUDENT PAPERS (0%). The right screenshot is from a 'Report by Plagiarism Checker', showing 'RESULTS' with a '100%' completion status and a 'Plagiarism' score of '0%' (0/100). Both reports indicate that the content was successfully evaded by the anti-plagiarism software.

Image.2. The article post spinning was able to evade both of the anti-plagiarism software.

How to Curb the Menace?

Author(s) have been successful in utilizing the “SPIN” to their advantage. One can come across large number of articles that have been published in various journals with low quality content, duplicate data, and lack of clarity and poor use of language. Several factors are responsible for the current miserable scenario and must be taken into serious considerations.

1. Staying out from publishing in Paid/ Sub-standard journals: Author(s) must refrain themselves from publishing in low quality paid (predatory) journals that promise to review and publish the papers within a week or such small period of time. These journals operate with the sole motto of making business and earning huge profits, thus in the process compromising with the quality.
2. Strict Governmental Regulations: The government must set up a regulatory board to strictly monitor the functioning of journals and must evaluate their standard from time to time. Predatory journals must be blacklisted and author(s) publishing their work in such journals should be made answerable and penalised if needed. This would prevent further adulteration of scientific ethics and standards.
3. Awareness among research scholars and students at institutional level: It is the duty of faculty members, supervisors and project investigators to make aware the students and the research scholars about the detrimental effects of malpractices and plagiarism in research. A short duration course/module must be incorporated at the institutional level to make students, scholars and teachers acquainted with the various aspects of manuscript preparation and publishing, good research practices and others. Senior faculty members and supervisors should refrain from giving any kind of advices that would in any way support malpractice in any form.
4. Role of Reviewers: Reviewers and editorial members of journals have a major role to play in this regard. It is their responsibility to filter out such articles during the time of reviewing manuscripts. Manuscripts with paraphrased content can be easily recognised from their use of language and confusing sentences. This needs scrupulous reviewing of the manuscript without being just superficial. This will not only help prevent the journal from publishing unworthy and substandard articles, but in turn will also raise the standards of scientific publishing. Publons(<https://publons.com>), a Clarivate Analytics company and part of Web of Science group provides training modules and certificate in peer reviewing. This could help researchers and reviewers to ameliorate their peer reviewing skills, increase the pool of reviewers and curb the dissemination of illegitimate articles.

It is high time now that we put a stop to the so called “*Spinners of Science*”. The development of science and the scientific community for the benefit of mankind surely lies in our own hands. As researchers and academicians we must acknowledge the contributions science has made in our life. We must forbid ourselves and others from indulging in acts of scientific fraud and misconduct.

Press Release

Speakers in International Conference on New Horizons in Biotechnology (NHBT-2019)

November 20-24, 2019; Trivandrum, Kerala, India

[URL:// www.niist.res.in/nhbt2019/](http://www.niist.res.in/nhbt2019/)

Like always BRSI's event gathers scientists all around the world and discuss various issues of Biotechnology. The event gathers a mix of Researchers and industrial partners and policy makers who decided the future of Biotechnology in India in view of International development in the area. Following Scientist have till now confirmed to be speaker at NHBT 2019.

Name	Affiliation
Adani, Fabrizio	University of Milan, Milan, Italy
Aguilar, Cristobal	Universidade Autonoma de Coahuila, Coahuila, Mexico
Anderson, Robin	US Department of Agriculture, USA
Angeldaki, Irini	Technical University of Denmark, Denmark
Awasthi, Mukesh K	Northwest A&F University, Yangling, China
Balan, Venkatesh	University of Houston, USA
Baskar, G	St Joseph's College of Engineering, Chennai, India
Boopathy,Ramaraj	Nicholls State University, Thibodaux, Louisiana, USA
Bosnea, Loulouda	University of Patras, Patras, Greece
Budhijanto, Wiratni	Gadjah Mada University, Indonesia
Bui, Xuan-Thanh	Ho Chi Minh City University of Technology, Viet Nam
Castro, Eulogio	University of Jaen, Jaen, Spain
Champagne, Pascale	Queen's University, Kingston, Ontario, Canada



Chandel, Anuj Kumar	University of Sao Paulo, Brazil	Karimi, Keikhosro	Isfahan University of Technology, Isfahan, Iran
Chandra, Pranjal	Indian Institute of Technology, Guwahati	Khanal, Samir	University of Hawaii at Mānoa, Honolulu, Hawaii, USA
Chang, Jo-Shu	National Cheng Kung University, Tainan, Taiwan	Khare, Sunil K	Indian Institute of Technology, New Delhi, India
Chang, In Seop	Gwangju Institute of Sci & Technology, Gwangju, Korea	Kim, Donghyuk	Ulsan National Inst of Science and Technology, Ulsan, Korea
Chhabra, Meenu	Indian Institute of Technology, Jodhpur	Kim, Han S	Konkuk University, Seoul, Korea
Charles, Adentunii	Edo University Iyamho, Edo State, Nigeria	Kim, Sang-Hyoun	Yonsei University, Seoul, Korea
Cheirsilp, Benjamas	Prince of Songkla University, Hat Yai, Songkhla, Thailand	Koutinas, AA	University of Patras, Patras, Greece
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Ferreira, Jorge	University of Borås, Borås, Sweden	Lee, Sung Kuk	Ulsan National Institute of Sci and Technology, Ulsan, Korea
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Guo, Wenshan	University of Technology Sydney, Sydney, Australia	Lin, Carol	City University of Hong Kong, Hong Kong
Gummadi, Satyanarayana	Indian Institute of Technology, Chennai, India	Lu, Fan	Tongji University, Shanghai, China
Itilong, Jester N	De La Salle University, Manila, Philippines	Madhyastha, Harishkumar	University of Miyazaki, Miyazaki, Japan
Jahan, Md Sarwar	BCSIR Laboratories, Dhaka, Bangla Desh	Maina, Sofia	Agricultural University of Athens, Greece
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		Masek, Ondrej	Edinburgh University, Scotland, UK

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Mohanty, Kaustubha	Indian Institute of Technology, Kharagpur, India	Saratale, Ganesh D	Dongguk University, Seoul, Korea
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Muraleedharan, Usha	Goa University, Goa, India	Sauer, Michael	Univ of Natural Resources and Life Sci, Vienna, Austria
Murthy, Ganti S	Oregon State University, Corvallis, Oregon, USA	Schievano, Andrea	University of Milan, Milan, Italy
Navcharaiah, VV	Bhabha Atomic Research Centre, Kalpakkam, India	Scrutton, Niegel	University of Manchester, Manchester, UK
Ng, How Yong	National University of Singapore, Singapore	Shiung, Lam Su	Universrity Malaysia Terengganu, Malaysia
Ngo, Huu Hao	University of Technology Sydney, Sydney, Australia	Shukla, Pratyosh	Maharshi Dayanand University, Rohtak, India
Nguyen, Dinh Duc	Kyonggi University, Korea	Shurpali, N Jagannathrao	University of Eastern Finland, Finland
Oeschner, Hans	University of Hohenheim, Germany	Sim, Sang Jun	Korea University, Seoul, Korea
Ok, Yong Sik	Korea University, Seoul, Korea	Singh, Rajendra Prasad	Southeast University, Nanjing, China
Pandian, SK	Alagappa University, Karaikudi, India	Singh, Sanjeev K	Alagappa University, Karaikudi
Panesar, Parmjit S	Sant Longowal Inst of Engineering & Technology, Longowal	Singh, Suren	Durban University of Technology, Durban, South Africa
Papamichael, EM	University of Ioannina, Greece	Singh, Vijay	University of Illinois, USA
Park, Sunghoon	Ulsan National Institute of Sci and Technology, Ulsan, Korea	Singhal, Rekha	Institute of Chemical Technology, Mumbai
Parmaul, Kugenthiren	Durban University of Technology, Durban, South Africa	Singhania, Reeta R	Centre for Energy & Environmental Sustainability, Lucknow
Patel, Anil K	Korea University, Seoul, Korea	Soccol, Carlos Ricardo	Federal University of Parana, Curitiba, Brazil
Patil, Sunil	Indian Institute of Science Education and Research, Mohali	Soccol, Vanete-Thomaz	Federal University of Parana, Curitiba, Brazil
Ramteke, Pramod	Sam Higgin Bottom University of Agriculture, Allahabad	Srivastava, Vikas	CSIR-Indian Institute of Toxicology Research, Lucknow
Raud, Merlin	Estonial University of Life Sciences, Estonia	Sundar, D	Indian Institute of Technology, New Delhi
Rene, Eldon	IHE Delft Institute for Water Education, Delft, Netherlands	Surampalli, Rao Y	GIEES, Kansas, USA
Rodríguez, Silvia Bolado	University of Valladolid, Spain	Swapna, TS	University of Kerala, Trivandrum
Rodríguez-Serrano, GM	Metropolitan Autonomous University Iztapalapa, Mexico	Taherzadeh, Mohammad	University of Borås, Borås, Sweden
Rojkova, Alexandra	Russian Academy of Sciences, Moscow, Russia	Teixeira, Jose Antonio	University of Minho, Braga, Portugal
Rova, Ulrika	Lulea University of Technology, Lulea, Sweden	Thakur, Indu S	Jawaharlal Nehru University, New Delhi, India
Ruan, Rongsheng Roger	University of Minnesota, St. Paul, Minnesota, USA	Tong, Yen Wah	National University of Singapore, Singapore
		Toogood, Helen	University of Manchester, Manchester, UK

Tsou, Erminda	Agricultural University of Athens, Greece	Wilkins, Mark	University of Nebraska- Lincoln, USA
Tripathi, Timir	North-Eastern Hill University, Shillong, India	Wong, Jonathan WC	Hong Kong Baptist University, Hong Kong
Tsang, Daniel	The Hong-Kong Polytechnic University, Hong Kong	Wu, Yonghong	Institute of Soil Sciences, CAS, Nanjing, China
Tsang, Yiu Fai	Polytech University, Hong Kong	Xie, Li (Sally)	Tongii University, Shanghai, China
Tyagi, Rajeshwar	INRS, Quebec, Quebec, Canada	Xu, Fuqing	Xian Jiaotong University, Xian, China
Vandenbergh, Luciana	Federal University of Paraná, Curitiba, Brazil	You, Siming	University of Glasgow, Glasgow, UK
Varjani, Sunita	Gujarat Pollution Control Board, Gandhinagar, India	Yu, Jianglong	University of Newcastle, Callaghan, Australia
Vial, Christophe	Université Clermont Auvergne, Clermont Ferrand, France	Yusup, Suzana	Universiti Teknologi Petronas, Malaysia
Visvanathan, C	Asian Inst of Technology, Klongluang, Thailand	Zhang, Guangming	Renmin University of China, Beijing, China
Wang, Xiaonan	National University of Singapore, Singapore	Zhang, Zhengquiang	Northwest A&F University, Yangling, China
Wang, Zhengxiang	Tianjin University of Sci and Technology, Tianjin, China	Zorov, Ivan	Russian Academy of Sciences, Moscow, Russia



BioSD 2018 was organized by BRSI and CSIR-IICT to celebrate 75th anniversary of IICT, Hyderabad, India.

Guest Article

ASPIRE-BioNEST at UOH: Nurturing Entrepreneurship and Scaling Technologies in Life Sciences

By Sreedhar R Voleti, MD, ASPIRE-BioNEST

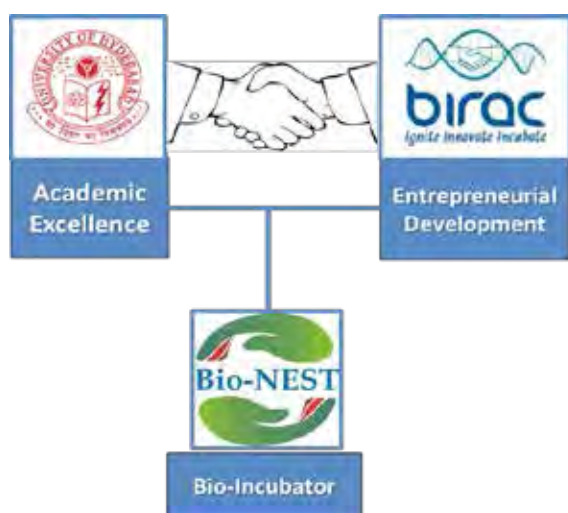
Quoted *“The Hidden Jewel”* by Utkarsh Palnitkar, ex KPMG Life Science Specialist, his maiden after a visit to ASPIRE-BioNEST, So impressed with the BioNEST, he agrees with the author who tossed word “Plug-and-Play Life Science Incubator that is Unique and Diverse” that recently inducted into the entrepreneurial nurturing activity of the existing incubators on the campus University of Hyderabad (UoH).

“The Best BioNEST” enthusiastically and passionately commented by Professor Padmanaban, G, an eminent life scientist from Indian Institute of Science and the Senior Advisor, Science and Technology, BIRAC during the inaugural and just after 1st anniversary of BioNEST at UoH, gives a boost to the enthusiasm of nurturing scaling technologies in life sciences in the Hyderabad region.

With over 40-academic units consistently performing to achieve academic excellence for over 40 years, UoH is envisaging on its lateral vision in creating, nurturing, and promoting entrepreneurship culture, thus with the support and encouragement of GOI, lead to initiation of translational research culture aimed largely for the societal benefits to realize in faster time scales.



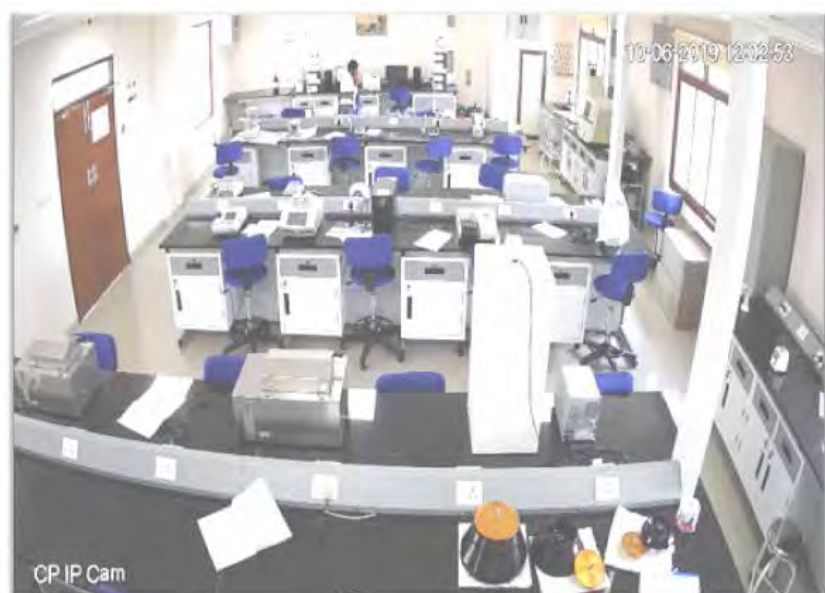
During November, 2017, the BIRAC (Biotechnology Industry Research Assistance Council), a section-8 not-for-profit company initiative by Department of Biotechnology (DBT) granted UoH to establish Bioincubators Nurturing Entrepreneurship and Scaling Technologies (BioNEST), a flagship project that encourages start-ups developing scaling technologies in life sciences.



UoH together with knowledge-based expertise and its entrepreneurial expertise and BIRAC with its vision and support, co-jointly created BioNEST with a **“plug-and-play”** ecosystem that facilitates start-up innovators and entrepreneurs in developing and scaling technologies that are commercializable **in life sciences domain**. Simply put, figure-2 brings BioNEST at UoH into existence with a collaborative effort, with about a size of 20000 sqft size, located on the 3rd floor of the School of Life Sciences, University of Hyderabad.

The University of Hyderabad thus provides a fully furnished physical infrastructure of research laboratories, while the BIRAC gave itemized budget-head grant for equipment, furnishing, renovation with operational expenditure (recurring grant) that sustains for next five years. The culmination of such ideological thoughts of academic excellence of the UoH and the entrepreneurial development of BIRAC made the inception of a BioNEST, the bioincubator in Life Sciences at the UoH made feasible.

Physical Infrastructure @ ASPIRE-BioNEST:



The University of Hyderabad has provided state-of-the-art physical infrastructure of about 20000 SFT, comprising of (a) A 10000SFT divided into 30 labs of 12-each of 250 and 350SFT, and 6 labs of 450SFT denominations (b) A 1000 SFT co-working space for early stage entrepreneurs with ideation stage, (c) another 1000 SFT for common instrument facility, and (d) 1000SFT of common research labs of animal and microbial cell-culture facilities, common wash area for autoclaving, and (e) 1000 SFT of office space, meeting rooms. A widespread 10-feet corridor provides

enough flexibility for personnel to move around. All labs are well equipped with lab-benches fully furnished with electrical, water and centralised air conditioning systems. The common instrumentation facility is well equipped with basic infrastructure required in the areas of biology and biotechnology. These range from small instruments like pH meters, weighing balances, shakers, gel-docs etc. to large instruments like HPLCs, laminar flows, microscopes, incubators (CO₂ and BoD).

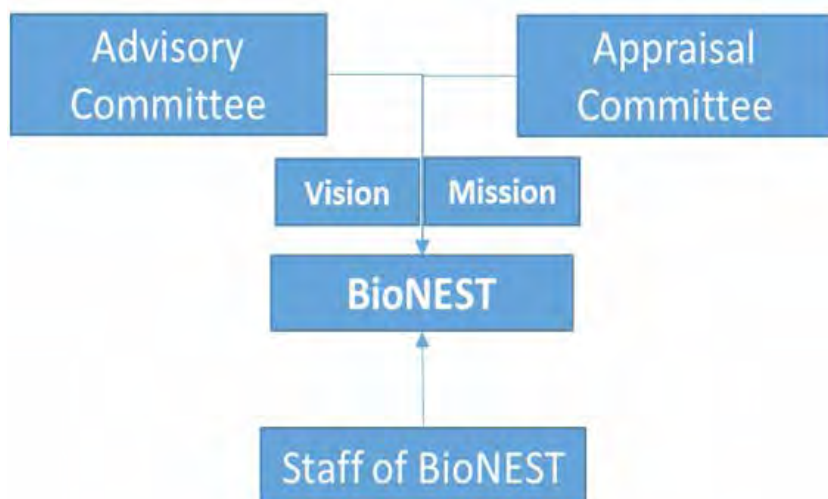
Coinciding with the National Science Day, the BioNEST at the University of Hyderabad facility was inaugurated on February, 28, 2018, and commissioned for conducting full-fledged operations from June, 2018 onwards. The facility is fully equipped with safety measures such as fire-alarm systems and 24/7 monitored central video surveillance system. instrumentation installed at the ASPIRE-BioNEST is freely accessible to the incubatees 24x7. Together with the established ready-to-work infrastructure and with internationally acclaimed knowledge expertise of the faculty, the BioNEST at UoH brings an unparalleled vibrant “*plug-and-play*” life sciences incubator environment ecosystem for the startups.

The ASPIRE-BioNEST incubation center provides unique ecosystem, in that it is located within the School of Life Sciences which is one of the largest schools with 65 faculty members working in diverse cutting edge areas of biology and biotechnology with more than 300 PG students, 350 PhD scholars and 60+ post docs and state of the art infrastructure in genomics, proteomics, metabolomics, imaging technologies and bioinformatics facilities, which are accessible to the incubatees. Also the incubatees can have access to one of the largest digital libraries in the country, Central Instrumentation Laboratories (CIL), Center for Molecular Simulation and Design (CMSD). Thus the UoH BioNEST incubation center provides ideal environment for the startup companies in life science sectors unparallel to any in the country.

Functional and Incubation Advisory for ASPIRE-BioNEST:

The board-of-advisory that provides direction to the ASPIRE-BioNEST consists of eminent scientists, visionaries and successful businessmen in entrepreneurship. Keeping in mind its genesis, the interest of entrepreneurial vertical of UoH, the advisory board decided that (a) *it shouldn't be following any real-estate incubator model*, and (b) *it should be knowledge-driven with diversity and uniqueness*. The board decided that the vision and mission of ASPIRE-BioNEST at UoH shall be aimed at translating inventive ideas to innovative R&D, technologies, or products with commercializable intellectual properties and platforms in Life Sciences including areas of Agriculture, Biotechnology, Healthcare, Pharmaceutical, Information Technology, and allied areas. The project-appraisal committee (PAC) comprising of key faculty of the School of Life Sciences and external members with proven scientific, business, venture capital, and subject matter eminence, meets periodically to identify, evaluate, and select startups that have synergistic research interests aligned with the vision and mission of ASPIRE-BioNEST.



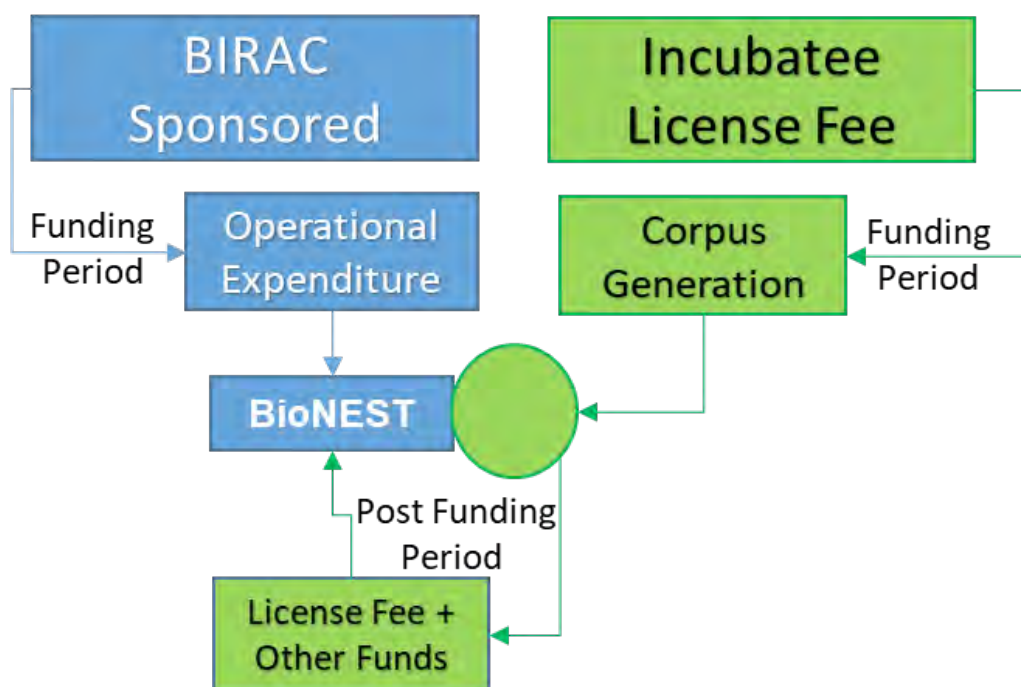


So far, the advisory governance with the stringent selection criteria imposed, ASPIRE-BioNEST maintains a one-in-three selection ratio for startups for incubation space. The two-step evaluation process brings quality incubatees to the bio-incubator.

Business Models for Self-sustenance of ASPIRE-BioNEST:

BIRAC funds every BioNEST to survive on during funding period, and expects the host organization and the BioNEST to support the idea of nurturing innovations for long even after post-funding scenario. To accomplish this vision, the ASPIRE-BioNEST visions a self-sustenance model of the incubator, and practiced accordingly. The business model of self-sustenance is to create a corpus for the first few years during the funding-period through incubation, CSR, and other methods of revenue generation, and utilize that as the base to self-sustain post-funding scenario.

The ASPIRE-BioNEST offers two models for prospective incubatees, with equity and without equity and accordingly, the license-fee is being charged. The license fee is collected on a monthly basis – which was arrived after brainstorming of members of advisory committee keeping in mind the overall burn rate of the incubation center with no discomfort to the incubatees.



Incubatees with Key face-changing Technologies and MoUs:

At ASPIRE-BioNEST, incubatees conducting cutting edge research range from Agriculture to Pharmaceuticals, are seriously building new technologies/platforms that are scalable, translatable, and commercializable. Within a short period of its existence, the ASPIRE-BioNEST incubation center has incubated following companies focusing on divergent areas of Life Sciences. The entrepreneurs conducting the above research are acclaimed scientists from across the globe with excellent academic and broad therapeutic expertise from industry, as given in the table below.

#	Name of the Company	SQFT	# Emp	Thrust/Focus Research Area
1	Albus Eco Projects Pvt. Ltd.	350	2	Industrial Biocatalysts
2	Avyantra Health Tech. Pvt. Ltd.	BS	2	Healthcare
3	Reagene Biosciences Pvt. Ltd.	250	4	Alternatives to In vivo
4	Vectrogen Biologics Pvt. Ltd.	250	4	Cosmetics and Nutraceuticals
5	SriBio Aesthetics Pvt. Ltd.	350	4	Nanomicrobiome based works
6	OncoSeek Pvt. Ltd.	250	3	Oncology and diagnostics
7	Therazymes Pvt. Ltd.	700	4	Industrial Bio enzymes
8	Sasyaved LLC.	250	2	Hydroponics
9	Srilatha Bio Pvt. Ltd.	250	3	Healthcare
10	Algen Bio Pvt. Ltd.	250	2	Industrial production of metabolites
11	Novick Bio Pvt. Ltd.	350	2	Drug Discovery in Oncology
12	ACGE India Pvt. Ltd	350	2	IVF technologies in animal biology
13	Terra Scientific Pvt. Ltd.	700	4	Metabolites, Enzyme Catalysts
14	VINS BioPharma Pvt. Ltd.	350	2	Snake Venom
15	Panaceja Biopharma Pvt. Ltd.	BS	1	Plant-based biotechnology
16	PhoSynFuels LLC	BS	1	BioOils and BioFuels
17	Innovaccel Pvt. Ltd.	450	2	Healthcare and R&D

ASPIRE-BioNEST made several MoUs with organizations which not only interacts with the incubatees but also facilitate industry-academia interactions with the faculty in the School of Life Sciences such as *Tech-Mahindra*, *Vajra Soft Inc.*, *Startup Accelerator India*, and *Bio-RxVenture Advisers*. This incubation center conducts conferences and workshops related to business, corporate, entrepreneurship, financial, intellectual, lateral-technical, legal, technical, and allied aspects as part of entrepreneurial development, and also provide Mentors-On-Need to the incubatees in the above areas.

ASPIRE-BioNEST incubation center thus provides an ideal infrastructure and supporting system enabling startup companies to establish and succeed in their ventures. Interested startups may contact all around the year in the office of BioNEST UoH.

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NEWS: Govt & Industry

Biologist Chandrima Shaha became first woman president in INSA's 85-year history

Dr Chandrima Shaha, a biologist and professor at the National Institute of Immunology, is all set to become the first woman to head the prestigious Indian National Science Academy (INSA). As president-elect of the INSA, she intends for science communication to be tackled “aggressively” and pseudo-science to be combatted when she takes charge as President in January 2020.



Dr Shaha has previously served the INSA as vice-president and director of the National Institute of Immunology, Delhi. Shaha often felt “invisible” as a young scientist sitting among her male colleagues.

“Initially, when we started our careers, nobody would shake hands with women scientists,” Shaha recalls to The Print, adding they would be completely “ignored” by her male colleagues. Even male scientists that were married to “career women” greeted everyone else but their female colleagues, she added.

Before setting her eyes on research and biology, in particular, Shaha was also a cricketer and a commentator for All India Radio, she told The Hindu. Playing cricket taught her the value of teamwork, she added.

Graduating with a Masters of Science from the University of Calcutta, she went on to complete her doctoral research in 1980 from the Indian Institute of Chemical Biology. At the University of Kansas Medical Centre, she carried out two years of post-doctoral research and remained at the Population Council of New York City for two more years. In 1984, Shaha joined the National Institute of Immunology as a researcher.

Today, the focus of Shaha's research is communication pathways for cell death. Her laboratory has studied the precise mechanisms of cell death and the role that signalling pathways play in regulating cell death. A parasite known as *Leishmania*, and cancer cells, are model organisms that Shaha uses in her research. *Leishmania* causes kala-azar (a.k.a black fever or leishmaniasis) is a vectorborne disease that affects the abdomen — understanding how these cells die can help kill/treat the disease.

Other Council Members of Biology field selected for year 2019 are: Professor V Chandrasekhar, Professor JP Khurana, Professor Gaiti Hasan, Professor Subrata Sinha, Professor Manju Bansal, Professor Amitabha Chattopadhyay, Professor Debashish Chowdhury, Professor Aparna Dutta Gupta, Professor Rentala Madhubala, Dr HK Majumder, Dr SWA Naqvi, Professor GVR Prasad, Professor Shobhona Sharma, Professor Yashwant Singh, Dr RV Sonti, Professor GC Mishra and Professor R Ramamurthi.

Rotavirus vaccination to be expanded across India by September 2019

The plan to provide the Rotavirus vaccine to prevent diarrhoea will be now be expanded across India by September, Union Health Minister Harsh Vardhan said.

“The Health Ministry has drawn plan under the 100-day agenda of the newly-elected government, wherein it has been decided to provide rotavirus vaccine to every child across all 36 States and Union Territories (UTs) by September 2019,” said Harsh Vardhan.

Every year in India, 37 out of every 1,000 children born are unable to celebrate their fifth birthday, and one of the major reasons for this is deaths due to diarrhoea. Rotavirus is a leading cause of diarrhoea in children less than five years of age. It is estimated that it causes 8,72,000 hospitalisations, 32,70,000 outpatient visits and estimated 78,000 deaths annually in India.

Rotavirus diarrhoea, unlike other forms of diarrhoea, can only be prevented through the vaccination. Other forms can be prevented by maintaining basic hygiene — frequent hand washing, safe water and food consumption, exclusive breastfeeding and vitamin A supplementation.

Harsh Vardhan further said that diarrhoea is one of the biggest cause of death among children and Rotavirus is one of the most common causes of severe diarrhoea in children less than two years of age. “Rotavirus vaccine along with proper sanitation, hand washing practices, ORS and zinc supplementation will go a long way in reducing the mortality and morbidity due to diarrhoea in children,” he mentioned.

When the Rotavirus vaccine pilot was launched, concerns were raised about intussusception — an intestinal blockage in babies, caused as a possible side-effect of the vaccine. Health Ministry officials said that such cases were not recorded in the pilot.

India is committed to ending morbidity and mortality in children due to diarrhoea by 2022. The Minister further added that the government is also committed to increasing the full immunisation coverage and ensuring that the benefit of the life-saving vaccines is provided to every child. According to the National Family Health Survey 2015-16, the immunisation coverage in India stood at 62 per cent, lagging behind China (90 per cent), Bangladesh (95 per cent) and Sri Lanka (95 per cent).

Three doses of the Rotavirus vaccine are provided along with other vaccines, free of cost, under Universal Immunisation Programme at one-and-half-months, two-and-half-months, and three-and-half-months of age.

	Team Leader Name & Address	Proposal Title
1	Dr. Renu Vyas MIT School of Engineering, Science & Research, MIT-ADT University, Pune	Solving plastic based menstrual waste crisis using synthetic biology
2	Dr. Chaitanya A Athale Division of Biology IISER, Pune	A synthetic biology approach to directed evolution
3	Dr. Rohini Garg Shiv Nadar University, Gr. Noida Gautam Budh Nagar	AlBaCo: An Algal-Bacterial Consortium for Detection and Degradation of Endocrine disruptors
4	Prof. Basuthkar J Rao Dean and Chair, Dept. of Biology IISER, Tirupati	Probiotic Immunotherapy for treatment of Colon Cancer
5	Dr. Utpal Nath Department of Microbiology & Cell Biology IISc, Bangalore	N-CAPSULATE

Selected team for iBEC-2019

Since 2015, Department of Biotechnology has been supporting a nationwide pre-competition - Indian Biological Engineering Competition (iBEC) for selection of teams comprising UG/PG students along with Mentor to participate in International Genetically Engineered Machine (iGEM) competition.

To create such an organized structure, it was decided to hold a special pre-competition event, inviting applicants, shortlisting them and offering them a platform for presentation, leading to review and improvement of their designs for their participation in the Annual Competition held at Boston, USA. Since 2015, DBT has supported 17 students team comprising 85 students for Consumables, Travel and Registration support. With reference to the 4th Call of

iBEC-2019, a total of 26 proposals were reviewed and evaluated by the Expert Committee constituted by DBT. Following 5 teams have been selected for further support from DBT to participate in upcoming iGEM-2019 competition at MIT Boston, USA. DBT will support ` 10.00 lakhs each to the above 5 teams towards Consumables, Registration Fees to iGEM-2019 and Travel Expenses.

Authorship in 73 journal papers from India up for sale

A Russian website has listed 344 papers accepted for publication by journals from different countries where authorship is available for a fee. There are 73 papers listed from journals based in India, which is

the highest. Web of Science Group, Clarivate Analytics is investigating to identify the journals. There are many things that remain unclear.

An “online marketplace” for researchers to sell and buy authorship in scientific papers that have been accepted for publication in scientific journals has been brought to light by the Web of Science, a Clarivate Analytics company based in London. An investigation by the company revealed that a Russian website International Publisher facilitates the scam. Retraction Watch blog was the first to report this.

According to Google translation, the website states: “We sell publications of finished articles in Scopus and Web of Science journals (articles written and accepted in journals; sold in parts or in whole).” It assures researchers of sure publication and indexing if they are willing to part with hundreds of dollars to become authors of a study that

they never worked for or wrote.

The website lists 344 articles for which first, second, third or more authorship is for sale. Of the 344, 73 papers where authorship is for sale are from journals based in India. With 54, Venezuela has the second highest number of papers listed followed by U.S (38), Russia (33) and Pakistan (28). Though there are a few dozen papers listed from these countries, it is not clear how many journals from each country are engaged in this unethical practice.

Though the site claims that the journals are indexed in Scopus or Web of Science, it is not clear if these are predatory or standard journals. Where the site claims that certain authorship has already been sold, it is not known if people had actually paid. It is also unclear if any papers have actually been published in any journal through this route.

The cost of first authorship is highest and reduces for the successive authors for any paper listed on the website. The cost of first authorship varies from \$285-\$1,222. Papers with five authors have been listed, though the normal number is three or four.

Journal Oncotarget threatened Owner of

Retraction watch

Article published on blog For Better Science by Leonid Schneider

The Open Access (OA) journal Oncotarget went mad. Utterly and completely bonkers. Its owners namely decided to threaten me with lawyers because I do not bring their outlet enough respect, presumably by constantly publishing articles about various dishonest cancer researchers who seem to have discovered Oncotarget at their fraud-to-Gold OA outlet of choice, for a fee of \$3,400. This Oncotarget is run by two Editors-in-Chief, Mikhail (Misha) Blagosklonny and Andrei Gudkov, both from Roswell Park Cancer Institute, in Buffalo, NY, and Blagosklonny's former lab colleague and now Impact Journals Executive Manager, Zoya Demidenko. The lawyer they released upon me is interestingly yet another Soviet emigree, Arkady Bukh, who is registered in New York and specialises in criminal law.

Apparently even with Beall's List gone, Oncotarget's reputation is still not as high as desired. The journal was delisted first by MedLine, and then by Clarivate, the company which issues the sacred Journal Impact Factor. Must be particularly painful if you call yourself Impact Journals. I don't know if these also received cease and desist letter from Bukh the lawyer, or maybe I am a special case. What did I do? Well, is it really my fault that these

questionable cancer researchers repeatedly published fabricated data in Oncotarget, without much consequences so far: Giorgio Zauli, Karin Dahlman-Wright, Li Jia, Guoqiang Zhao, and others, and there are many more featuring on PubPeer.

Another case Oncotarget is angry at me for is: I prevented a truly deranged retraction of a paper whose author merely asked for his name to be written correctly, in an Oncotarget paper already published online. The author was the Spaniard Antonio Herrera-Merchan, coauthor and later whistleblower in the case of the Madrid fraudster Susana Gonzalez. His new employer tried to shorten the name to just Herrera in order to hide the unpleasant Gonzalez connection, the postdoc however insisted to remain Herrera-Merchan. That was reported by Retraction Watch, who also asked Committee on Publication Ethics (COPE) to provide an authoritative opinion what Antonio's real name is, unironically. Then Oncotarget began "investigating" and retracted the paper. After I called them out, Blagosklonny ordered me to "Write to legal department 9 to 5", then I received some weird emails from Ryan James Jessup, Oncotarget's legal affairs person, and eventually the paper disappeared completely.

RE: IMPACT JOURNALS, LLC
and ONCOTARGET

Mr. Schneider

Bukh Law Firm, PLLC has been retained by Impact Journals, LLC ("Impact") regarding your defa-

mation of one of its journals, Oncotarget (a primarily oncology-focused, peer-reviewed, open access, weekly journal) and the damages it has sustained as a result thereof. The purpose of this communication is to provide notice that you have been publishing blatantly false and defamatory statements concerning our client; and to direct you to immediately CEASE AND DESIST PUBLISHING, IN WRITING OR IN SPEECH, THE DESCRIBED BELOW DEFAMATORY CONTENT AFFECTING IMPACT JOURNALS, LLC AND ONE ITS JOURNAL, ONCOTARGET. CEASE AND DESIST ATTACKING MY CLIENTS' CHARACTER AND REPUTATION. PLEASE ALSO CEASE AND DESIST FROM DIRECTING OTHERS ON YOUR BEHALF TO PUBLISH THE DESCRIBED DEFAMATORY CONTENT.

Russian site says it has brokered authorships for more than 10,000 researchers

Want to be a first author on a scholarly paper? A Russian company has you covered — starting at about \$500. The company claims to have added the names of more than 10,000 researchers to more than 2,000 published articles in scholarly journals over the past

three years. Think eBay — or perhaps StubHub — for unscrupulous scientists.

Although we can't verify the numbers, at least one major journal indexer, from whom we recently learned of the scheme, is concerned enough about the site that it has demanded that it stop doing business.

According to the Russian outfit's site (through Google Translate):

We sell publications of finished articles in Scopus and Web of Science magazines (articles written and accepted in journals; sold in parts or in whole).

In other words, says Clarivate, the company perhaps best known for journal impact factors, the Russian brokerage — 123mi.ru — auctions authorship slots to researchers willing to pay hundreds of dollars for the service. Clarivate's Web of Science Group began investigating after staff at its Moscow office received a tip about the outfit, and sent a cease-and-desist letter to the operators of the service earlier this week.

According to a July 17, 2019, letter from the Web of Science Group to the Committee on Publication Ethics, the company found 344 articles for sale on the Russian website. Of those, 32, or 9%, are allegedly indexed on Web of Science and 303 (88%) appear in the Scopus database.

Evidently, the Russian fraudsters are neither ceasing nor desisting. In response to our request for

comment on the legal action, we received the following reply from a "Ksenia Badziun:"

Regarding the quantity of the manuscripts we have published, I want to confirm that it grows every time. It could be a pleasure for me to show all the list of the manuscripts we published, but due to the policy of our company and contracts between the authors/publishers and our company, I simply cannot do it. On the other hand, I want to inform that we have our own system and program with all the records and story on each particular manuscript sent to us from the authors. The access to our program is provided to some of the editors-in-chief, publishers and other our Partners.

A publishing vulnerability

Here's how the scheme likely works, according to Nandita Quaderi, editor in chief of Web of Science: An author, or group of authors, submits a paper and has it accepted. At that point, they submit a listing to the Russian site, offering additional authorships on the paper for a fee. The tactic exploits a vulnerability in the publishing process that allows authors to add names to manuscripts after acceptance. Such moves should raise a red flag, and have in at least a few cases.

However, at many journals, after acceptance the paper leaves the editorial department for the production offices, where workers — frequently with less experience — are unaware that it's bad practice to allow authors to add names.

“Someone working in production, right out of college, is being told by a senior professor that ‘I forgot to include my co-authors,’” Quaderi told Retraction Watch.

Although most of the journals involved are based in “developing economies,” according to Quaderi’s letter to COPE, some are in the United States, the United Kingdom and The Netherlands. The company declined to name the specific journals, saying that they are still investigating whether the editors and publishers are aware of the scam.

Data from the Web of Science Group show that India leads the current list of “seller” nations, with 73 papers from that country up for auction. That’s followed by Venezuela, at 54, the United States, at 38, Russia, with 33, and Pakistan, at 28.

The Russian company’s methods are sophisticated enough to charge more for first authorships — starting at 32,200 rubles, or about \$500 — than for second or third authorships. Fourth authorships, where available, run closer to 24,000 rubles, or \$380.

Why would scientists pay to get their names onto papers they didn’t write? The pressures to publish — frequently and in reputable journals — are so strong that some researchers feel the need to cut corners, cook results and take other shortcuts to get their names into the literature. In some cases, paying for the unearned privilege is simply a down payment with a

potentially lucrative payoff. Institutions, and even countries, are known to offer researchers cash awards for each publication. As we reported in Science in 2017:

Chinese universities offer first authors more than \$43,000 for publishing a paper in Science or Nature, with the top reward for such a paper reaching a knee-wobbling \$165,000.

‘WE GUARANTEE publication by 100%’

The website for the scheme offers would-be authors the following instructions:

On this page you can choose an article in your own direction and become one of the co-authors. Below is information about each publication. Right information about the cost, the magazine, the timing of submission and timing of publication. Left a brief description of the article and keywords. If in the list, on this page, you have found a suitable article, indicate its number # (Order number) and indicate what number in order in the list of authors you want to be.

In one example, an article on “Development of bio-compatible coatings for dental implants based on transition metal nitrides,” the site states that three of the four author slots have already been sold; one — third author — remains up for grabs. Want to know the journal being targeted? That information will cost you.

Elsewhere on the site is the boast

that:

We have more than 50 completed contracts with universities and research institutes, you can look at the office.

We are the ONLY on the market who can handle large volumes – up to 400 articles per month.

We are NOT CHEAP, because WE GUARANTEE publication by 100%.

ICMR-NICED scientist has 16 papers with duplicated, manipulated images

by Prasad Ravindranath
Posted on July 31, 2019

Dr. Mamta Chawla-Sarkar, a senior scientist at ICMR’s NICED has 16 papers listed on PubPeer for image duplication and/or manipulation. Six of these papers were published when she was a Post-doc in Cleveland Clinic Foundation, Cleveland, Ohio. She is a Fellow of the National Academy of Science.

A senior scientist — Dr. Mamta Chawla-Sarkar — in Kolkata’s National Institute of Cholera and Enteric Diseases (ICMR-NICED) has 16 papers listed on PubPeer website for image duplication and/or manipulation. Besides the 16, a

paper published in 2014 in PLOS ONE carries a correction for image duplication.

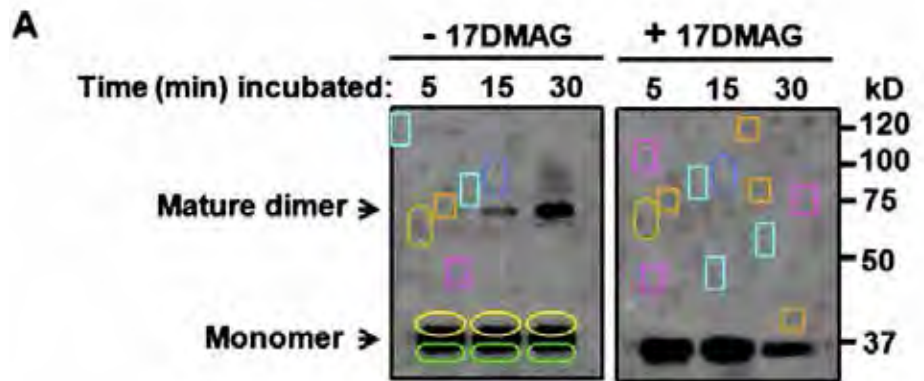
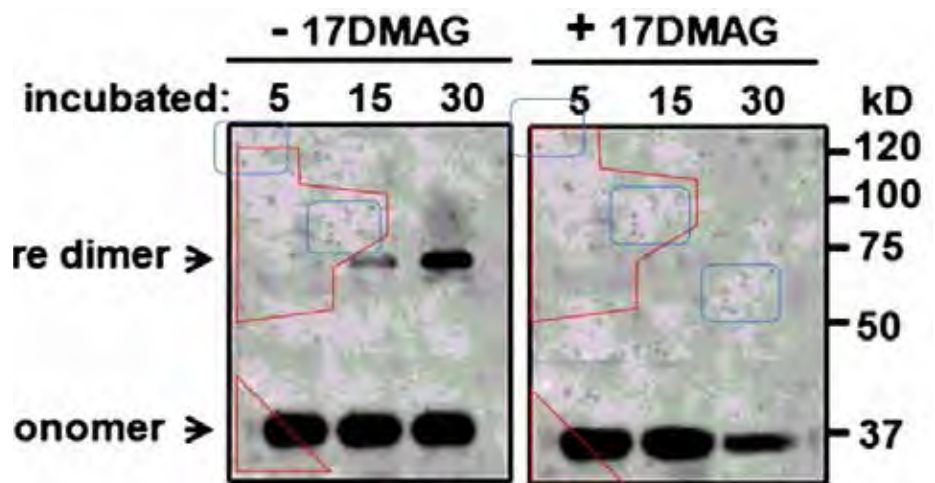
Ten papers listed on the website have been published when Dr. Chawla-Sarkar has been a scientist at NICED while the remaining papers were published when she was a Post-doc with Cleveland Clinic Foundation, Cleveland, Ohio, U.S.

All the papers with problematic images were verified by Dr. Elisabeth Bik, who is an expert in identifying duplication and manipulation in images. In addition, she had herself posted a few of Dr. Chawla-Sarkar's papers with problematic images on PubPeer. In fact, on July 13, Dr. Bik did tweet one of Dr. Chawla-Sarkar's manipulated images and asked if others could spot the manipulation.

Following the email interaction with her, the authors have responded on PubPeer for seven papers highlighted on the website. One of the responses is: "As authors, we have gone through the concern raised here. We would be communicating to the journal editor at the earliest with all the relevant data files."

Though there is clear evidence of manipulation in many images, Dr. Chawla-Sarkar insists and vehemently denies image manipulation in any of her papers. Dr. Bik counters saying: "It is hard to imagine how duplicated bands within figures could have resulted by honest error."

According to the NICED website, Dr. Chawla-Sarkar is "involved in



studying two viruses namely influenza virus and rotavirus". The focus of her research is "strain surveillance, host-virus interaction and identifying cellular proteins involved in viral pathogenesis for developing potential antiviral targets". She oversees "influenza surveillance" in NICED and was "responsible for providing laboratory support for states in Eastern India during the A/H1N1 pandemic in 2009".

In 2013, Dr. Chawla-Sarkar was elected Fellow of the National Academy of Science. She won the National Women Bioscientist Award given by the Department

of Biotechnology (DBT) in 2013. In recent years, she has won the ICMR Kshanika Oration Award 2017 and Fellowship of the West Bengal Academy of Science and Technology (FWAST) 2018.

"As far as word image manipulation is concerned, I do not agree as we have not manipulated or fabricated any data. The blots are scanned predominantly by the scholars and assembled into final figure but why would they manipulate images when they have reproducible data. Repetitive background elements that are shown here might come from manual handling while

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developing and scanning and are completely unintentional. We were even unaware of these until pointed out by PubPeer,” she says in an email.

“I am sure that the conclusions in the papers are valid because we repeat [the] experiment multiple times before conclusion [sic]; each conclusion in the figure is validated by at least two or three different assays. When a paper is submitted, reviewers are not satisfied until we prove the conclusion by multiple assays. Moreover, I check the raw data autorads when the data is presented in lab meetings,” she adds.

GSK stopped Development of Ebola and Marburg Virus Vaccines, Transferred Tech to Sabin Institute

Despite an ongoing Ebola epidemic in the Democratic Republic of Congo, GlaxoSmithKline (GSK) is abandoning its work on three vaccines against Ebola and Marburg viruses. It is transferring the work to the Sabin Vaccine Institute in Washington, DC. The company indicates there is no financial component of the transfer.



The vaccines are for Ebola Zaire, Ebola Sudan and the Marburg virus. Currently no licensed vaccines against these three viruses are available. All three diseases, which cause hemorrhagic fevers, have a death rate of about 50%. In the ongoing Democratic Republic of Congo outbreak of Ebola Zaire, more than 1,600 people have died so far.

Under the agreements, Sabin exclusively licensed the technology on all three vaccine candidates as well as certain patent rights specific to the vaccines. All three were collaboratively developed in the beginning by the U.S. National Institutes of Health and Okairo, which GSK acquired in 2013. The vaccines are based on GSK's ChAd3 platform, and then further developed by GSK, including the Phase II development of the Ebola Zaire vaccine.

So far, the ChAd3-based vaccines against these three viral strains have shown a strong safety pro-

file and encouraging immune-response data after being given to more than 5,000 adults and 600 children in 13 different clinical trials.

According to Reuters, GSK had postponed its Ebola vaccine work after it was unable to move the product through Phase III toward the end of the 2014 to 2016 epidemic because of decreasing numbers of Ebola cases.

Regeneron's experimental Ebola treatment also combines three fully-human monoclonal antibodies. The company reported in May 2018 that it was shipping the therapeutic to the Democratic Republic of Congo, which was one of three being evaluated by a panel of independent experts brought together by the WHO.

Gilead's drug came out of collaboration with the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) begun in

2014. It is a prodrug that is processed in the body to create an active drug. The drug is believed to work by blocking a key enzyme the Ebola virus needs for replication.

In May, WHO indicated it was running low on the Merck Ebola vaccine in Congo and was providing smaller vaccine doses and planned to use an experimental drug from Johnson & Johnson. Since August 2018, WHO indicates that 11,000 people in the Democratic Republic of Congo have been vaccinated, but new cases continue to be diagnosed.

U.S. FDA approved Daiichi Sankyo's Turalio (pexidartinib) for Tumor (TGCT).

TGCT is a rare, non-malignant tumor that can be aggressive locally. It affects the synovium-lined joints, bursae and tendon sheaths, which causes decreased mobility in the affected joint. It is typically benign, but because it affects the joints, can be debilitating

“The FDA approval of Turalio represents a paradigm shift in the treatment of carefully selected TGCT patients who face significant disease morbidity and for whom surgery is not an option,” stated William D. Tap, chief of the Sarco-

ma Medical Oncology Service at Memorial Sloan Kettering Cancer Center and lead investigator for the Phase III ENLIVEN trial. “We now have a new oral treatment option that can have a meaningful clinical benefit in select patients, including a reduction in tumor size.”

The approval is for only “select” patients where surgery isn't an option. It also comes with a Boxed Warning for liver toxicity, which has been a problem in several clinical trials with the drug. As a result, the FDA is requiring Daiichi Sankyo to offer the drug through a Risk Evaluation and Mitigation Strategy (REMS) Program, where only certified physicians can prescribe the drug. Biologics by McKesson, a specialized independent pharmacy for cancer and other complex therapies is the exclusive specialty pharmacy for Turalio.

Thermo Fisher Introduces AI Powered Analysis Software

Thermo Fisher Scientific has introduced the Thermo Scientific Avizo2D software, an AI-powered automated imaging and analysis

software designed to help materials and life science researchers acquire fast and accurate statistics from their electron microscopy (EM) images without extensive image processing expertise.

The new software, unveiled at Microscopy and Microanalysis 2019, allows scientists to build customized “recipes” or automated, reproducible workflow scripts that speed up their image analyses. The software combines deep learning models, advanced image processing technology, and modules using Python scripts and scientific tools to help researchers seamlessly analyze their EM images.

Dozens of pre-defined recipes from the Amira-Avizo Online Recipe Library can be directly used as workflow scripts or customized to meet researchers' specific analysis needs. Scientists can also combine Avizo2D with Thermo Fisher Scientific's MAPS Software, allowing them to optimize the instrument usage time and obtain instant feedback and an additional layer of understanding while the data is being collected. Avizo2D software will be commercially available starting in the fourth quarter of 2019.

Bayer completes acquisition of BlueRock Therapeutics for \$600 Million

Bayer already holds a 40.8% stake in BlueRock. Under the terms of the acquisition, Bayer is buying the rest of the company for \$240 million up front with an additional \$360 million in various development milestones. This will correspond with the company's value of about \$1 billion.

"This acquisition marks a major milestone on our path towards a leading position in cell therapy," stated Stefan Oelrich, member of the Board of Management, Bayer, and president of the Pharmaceuticals Division. "In line with our strategy to ramp up our investments in technologies with breakthrough innovation potential, we have decided to build our cell therapy pipeline based on BlueRock Therapeutics' industry-leading iPSC platform. Ultimately, we are joining forces to deliver new treatment options for medical needs that are still unmet today."

Bayer will own full rights to BlueRock's CELL+GENE platform, as well as its intellectual property portfolio and the related technology platform. This includes its proprietary iPSC technology, gene engineering and cell differentiation abilities. BlueRock is expected to stay an independent company "operating on an arm's-length basis," in order to preserve its entrepreneurial culture.

Leaps by Bayer is Bayer's investment arm, but also has a particular focus on cancer. Investments have included Casebia Therapeutics, BlueRock, Joyn Bio, Khloris, Century, and Pyxis. Casebia is using

CRISPR gene editing to focus on genetic disorders, Joyn is focused on probiotics for agricultural usage, and Pyxis is developing antibodies for immuno-oncology targets.

FDA Warning Letters in the BioPharma Industry of India in year 2019

As 2019 enters its second half, BioSpace takes a look at some of the warning letters issued by the U.S. Food and Drug Administration to the biopharma industry. In March, BioSpace took a look at a number of the warning letters issued across the industry and since then, more companies have been cited for violating regulatory codes.

Hospira Healthcare India – The FDA cited Hospira Healthcare India following a 2018 inspection of the company's manufacturing facility in India. The warning letter summarizes significant violations of current good manufacturing practice (CGMP) regulations for finished pharmaceuticals at the facility. Violations include inadequate record keeping, discrepancies in drug batches, and a lack of quality control in determining if each batch manufactured met CGMP codes.

Jubilant Generics – India-based Jubilant was cited for CGMP violations. There were batch discrepancies, as well as concerns over quality control of batches.

Anicare Pharmaceuticals – Also based in India, Anicare was cited for CGMP violations. Concerns included a lack of written testing to assess stability of products, and failures from the quality control team to approve and review written procedures.

Centurion Laboratories – India-based Centurion Laboratories was cited for CGMP failures. The facility was faulted for incomplete data regarding testing compliance. The FDA said during its 2018 inspection investigator found torn documents of stability study data, analytical testing sheets, analysis calculations and release forms placed into clear trash bags.

Aurobindo Pharma Limited – Aurobindo's Telangana India facility was cited for significant deviations from current good manufacturing practice for active pharmaceutical ingredients (API). Some of the violations included a failure to ensure that equipment surfaces in contact with API do not alter the quality of the API beyond the official or other established specifications.

Strides Pharma Science Limited – The India-based company was cited for CGMP violations that included the failure to establish an adequate quality control unit and the failure to investigate any unexplained discrepancies in batches.

NOTIFICATIONS



सत्यमेव जयते

DEPARTMENT OF BIOTECHNOLOGY

Ministry of Science & Technology, Govt. of India

BIOTECH INDUSTRIAL TRAINING PROGRAMME (BITP) 2019-20 UNDER DBT-SKILL VIGYAN

Applications are invited from Biotechnology students for hands on training in biotech companies for a period of six months. The programme provides excellent opportunity to biotech students to acquire practical skills and experience working on projects alongside industry experts as well as an opportunity to industry to identify potential candidates for selection as employees. During the training, stipend will be paid to trainees.

Attention: Biotechnology Students

Eligibility: B.E./B.Tech./M.Sc./M.Tech./M.V.Sc./MBA in Biotechnology/ Bioinformatics from Indian recognized universities with minimum **50%** marks or equivalent grade completed in the year **2018** or **2019**.

Mode of Selection: Candidates will be selected based on computer-based entrance test followed by interview. Entrance test would be conducted at multiple centers across the country.

Mode of Application: Biotech students interested in training in biotech companies may apply online. For detailed procedure for filling the application form, payment of application fee and uploading of required documents / certificates in the prescribed format, please visit: www.bcil.nic.in/bitp2019/index.asp.

A copy of the system generated acknowledgement and application form submitted online must be sent via speed post/ courier to Programme Co-ordinator, DBT-BITP, Biotech Consortium India, 5th floor, Anuvrat Bhavan, 210, Deen Dayal Upadhyaya Marg, New Delhi-110002, along with the following documents:

- A demand draft of **Rs. 500/-** towards non-refundable and non-transferable application fee as per the details at www.bcil.nic.in/bitp2019/instruction.asp. Please write your application id, name, date of birth and mobile no. on the reverse side of the demand draft.
- Self-attested copy of final mark-sheet of the qualifying examination indicating the cumulative percentage of marks or equivalent CGPA. For students appearing in the final examination in 2019, filled and signed certificate from Head of the Department on college/university letter head in the format available at www.bcil.nic.in.
- Self-attested copy of domicile certificate (North Eastern States students only)

Online application
process starts from

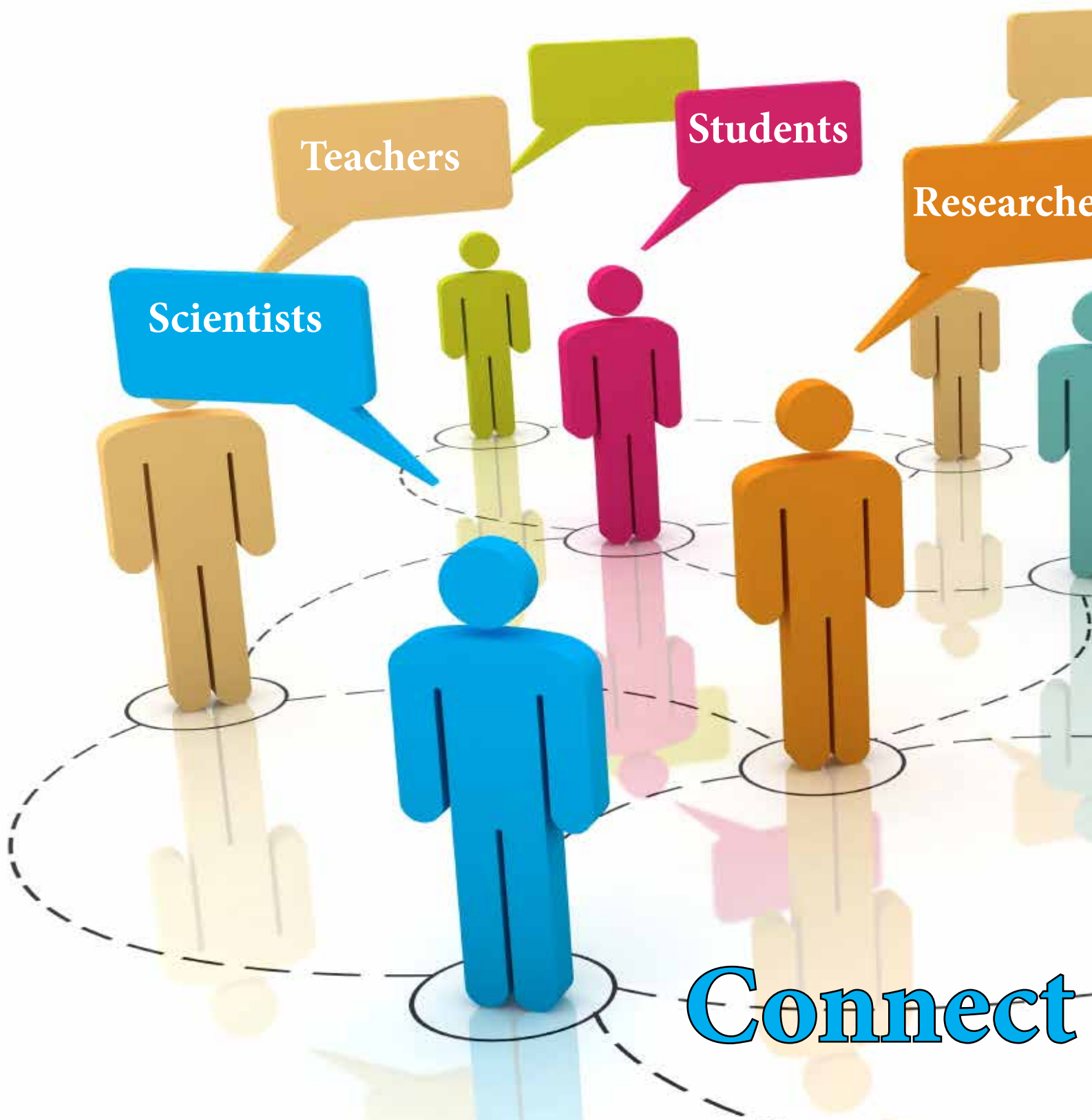
July 23, 2019

Last date
for submission

August 22, 2019

Note: Students with domicile in North Eastern States may apply as per the above advertisement. There will not be any separate notification for them.

In case of any query, please send email to bitp.dbt@nic.in



Teachers

Students

Researcher

Scientists

Connect

Contact: info@



<https://www.facebook.com/BiotechExpressmagazine>



with peers

@kashbiotech.com



<https://in.linkedin.com/in/kashbiotech>



National Awards

For Science & Technology Communication 2019
National Council for Science & Technology Communication
Department of Science & Technology
Ministry of Science & Technology, Govt. of India

Invites nominations for the following National Awards for 2019

a) National Award for Outstanding Effort in Science & Technology Communication (Rupees five lakhs)

Presented to an individual or an institution for outstanding work in communication of science and technology and/or promotion of scientific temper which had the widest impact in the country.

b) National Award for Outstanding Effort in Science & Technology Communication through Print Media including Book and Magazine (Rupees two lakhs)

Presented to an individual or an institution for outstanding efforts in popularization of science and technology and/or promotion of scientific temper through book, magazines, etc.

(c) National Award for Outstanding Effort in Science & Technology Popularization among Children (Rupees two lakhs)

Presented to an individual or an institution for outstanding work in popularization of science and technology and/or promotion of scientific temper among children which had the widest impact in the country.

(d) National Award for Outstanding Effort in Translation of Popular Science & Technology Literature (Rupees two lakhs)

Presented to an individual journalist or an institution for outstanding work in translating popular science and technology literature in and from regional languages.

(e) National Award for Outstanding Effort in Science & Technology Communication through Innovative and Traditional Methods (Rupees two lakhs)

Presented to an individual correspondent or an institution for outstanding efforts in communication of science and technology and/or promotion of scientific temper.

(f) National Award for Outstanding Effort in Science & Technology Communication in Electronic Medium (Rupees two lakhs)

Presented to an individual correspondent or an institution for outstanding efforts in communication of science and technology and/or promotion of scientific temper through radio and/or television media.

The last date for receipt of completed nomination form is 30 September, 2019.

Full details of the scheme including eligibility conditions, application format, etc., may be downloaded from the website of the Department: www.dst.gov.in

For further queries (if any) please contact:

Dr. ABP Mishra

Scientist

National Council for Science & Technology Communication

Department of Science & Technology

Technology Bhavan, New Mehrauli Road, New Delhi-110016

Telefax: 011-26535564 E-mail: apmishra@nic.in

Hands-on Workshop in Forensic DNA Fingerprinting



Venue: Centre for DNA fingerprinting and Diagnostics, Uppal, Hyderabad – 500 039

Date: 19-30, August, 2019

DNA fingerprinting or DNA profiling, considered as the gold standard for forensic human identification (HID), is widely employed throughout the world in criminal investigations, in resolving paternity/maternity disputes, for pedigree testing, to establish identity of unidentified human remains, and in missing persons' investigations and disaster victim identification (DVI). It has evolved tremendously in the last couple of decades, wherein it is now possible to obtain DNA typing results in a short span of time with small amounts of biological sample.

The success of forensic DNA testing in addressing the questions of HID has resulted in fresh challenges for the forensic DNA laboratories. To keep pace with the latest developments and cater to the increased casework DNA profiling demands in India, there is a tremendous demand for skilled DNA analysts. Keeping this in mind, the workshop is intended to train scientific personnel and other stakeholders in the country in the various aspects of state-of-the-art technologies in DNA profiling.

Objectives:

- To provide hands-on experience on DNA profiling methods and analysis of varied kinds of challenging forensic samples for forensic HID
- To impart training in mitochondrial DNA sequence analysis
- To provide a platform to understand the technical details starting from sample preparation to data interpretation and case reporting

Target group/Attendees: DNA Examiners involved in DNA Profiling & reporting of cases in the Courts of law



Contact details: Dr. Madhusudan Reddy Nandineni
Staff Scientist, Centre for DNA fingerprinting and Diagnostics,
Near Nagole Metro Station, Uppal, Hyderabad - 500 039.

Email: DFP@cdfd.org.in

Tel: 040-2721 6142/ 6143/ 6144

Fax: 040-2721 6006

DBT-CDFD

INNER RING ROAD, UPPAL, HYDERABAD – 500 039

Temporary vacancies in research project entitled “NATIONAL GENOMICS CORE”

CDFD, an autonomous institute of the Department of Biotechnology, Ministry of Science and Technology, invites applications from Indian nationals for the following purely temporary vacancies in research project entitled “NATIONAL GENOMICS CORE” funded by DBT. The application form and the General Conditions governing the advertisement may be downloaded from the CDFD website <http://www.cdfd.org.in>. The last date for receiving filled in applications is 31.08.2019.

CDFD wishes to fill up the following posts in the project

- 1) Chief Executive Officer (CEO): (01 No. post)
- 2) Project Coordinator – Administration: (01 No. post)
- 3) Experimental Laboratory Manager: (01 No. post)
- 4) Computational Laboratory Manager: (01 No. post)
- 5) Technical Associate (Experimental): (02 No. post)
- 6) Technical Associate (Computational): (02 No. post)

The applications duly completed and supported by attested copies of certificates, testimonials and Caste Certificate in the case of SC/ST/OBC candidates duly superscribing the name of the post in bold letters should be sent to “The Dean – Academics, Centre for DNA Fingerprinting & Diagnostics, Inner Ring Road, Uppal, HYDERABAD – 500 039”, so as to reach on or before 31.08.2019. Incomplete Applications and Applications without the caste / disability certificate (if applicable) or the applications received after the last date are liable to be rejected.

Sun Pharma Research/Science Scholar Awards – 2019 in in Medical Sciences | Prize Money Rs 250,000 Each

(a) Sun Pharma Research Awards – 2019 : There are three Awards of Rs 250,000 (Rupees two lakh fifty thousand) each; two in Medical Sciences (Basic Research and Clinical Research); and one award in Pharmaceutical Science.

(b) Sun Pharma Science Scholar Awards – 2019 : Sun Pharma Science Scholar Awards: There are four awards – two each in Bio-Medical Sciences and Pharmaceutical Sciences for Rs 50,000 each, and an additional amount of Rs 50,000 to attend international conference.

For further information, please contact: Tel.: (91-11) 2372 1414; 2372 1415; e-mail: sunpharma.science-foundation@sunpharma.com Website: <http://www.sunpharmasciencefoundation.net>



CSIR-Central Drug Research Institute, Lucknow
 (Council of Scientific and Industrial Research)
 Sector 10, Jankipuram Extension, Sitapur Road,
 Lucknow - 226 031, Uttar Pradesh, India



SCIENTIST RECRUITMENT-2019

Advertisement No **07/2019**

URL for Online Application:

<https://recruit.cdri.res.in>

OR

Access link 'SCIENTIST RECRUITMENT-2019' on <https://www.cdri.res.in>

Start Date for Registration for Online Application: Friday, 16 August 2019; 10:00 Hrs IST
 Last Date for Registration for Online application: Monday, 30 September 2019; 23.59 Hrs IST
 Last Date for Submission of Online Application: Monday, 30 September 2019; 23.59 Hrs IST
 Last date of Receipt of physical copy of application at CDRI: Tuesday, 15 October 2019; 17:30 Hrs IST

A unique opportunity for research career in Science & Technology in the area of Drugs, Pharmaceuticals and Biomedical Research

CSIR-Central Drug Research Institute, Lucknow, a premier Institute under Council of Scientific and Industrial Research (CSIR), is involved in multidisciplinary R&D programs of both basic and applied nature. CSIR-CDRI is a pioneer biomedical research organization in India and has the infrastructure and expertise to develop a drug from conceptualization to commercialization. In the year 2012, CSIR-CDRI shifted to its state of the art new campus, which has been set up with a vision to serve as a Nodal Center of CSIR in new drug discovery and development. Spread across ~61 acres, it houses an R&D Complex, Support Services, Guest House, Hostel and Staff Quarters. Please visit <https://www.cdri.res.in> for further information.

With the aim to expand and strengthen the areas of ageing biology, neurobiology, medicinal and natural product chemistry, virology, pre-clinical and clinical development, endocrinology, toxicology the Institute is looking for enthusiastic, talented young researchers / professionals with brilliant academic record, proven scientific achievements and zeal to conduct research as per the mandate of the Institute aligned with National Missions. Due weightage will be given to the candidates involved in the product development/ technology innovation/applied technics/ translation research. The positions offer exciting opportunities for career growth as per the Flexible Complementing Scheme for Scientists.

Applications are invited from motivated young Indian Nationals with requisite qualification and experience for the following posts as per the details given below.

The emoluments and age limit for various posts as per norms is summarized as below: -

Designation	No. of Posts	Pay Level	Basic	*Total Emoluments	**Upper Age Limit not exceeding (as on last date)
Scientist	09 {UR-3; SC-1; ST-1; OBC-1; EWS-1; PwD-2 (backlog)}	11	Rs. 67,700/-	Rs. 94,720/-	32 years
Senior Scientist	08 UR/Lateral Entry	12	Rs.78,800/-	Rs. 1,08,928/-	37 years
Principal Scientist	1 UR/Lateral Entry	13	Rs.1,18,500/-	Rs. 1,59,744/-	45 years



Notice



GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

Janaki Ammal-National Women Bioscientist Award 2019

Nominations are invited for Janaki Ammal-National Women Bioscientist Award 2019 to recognize and reward women scientists (senior & young) who have made outstanding contributions in basic and applied research in areas of Biosciences and Biotechnology including basic, agricultural, biomedical, veterinary and environmental sciences with potential for application/product and technology development and to provide research grant for their career development.

Senior Category

Citizens of India should have made life time significant and outstanding contributions in research in the areas of Biosciences/Biotechnology and has applied the results for the benefit of students and society and the work must have been done entirely in India.

Award Money- Rs 5,00,000/- (one-time)

Young Category

Citizens of India below 45 years who have made significant and outstanding research contributions in the areas of Biosciences/Biotechnology during last 5 years and the work must have been done entirely in India

Award Money- Rs. 1,00,000/- (one-time)

Research grant - Rs 25,00,000/- @ Rs 5,00,000/- per year

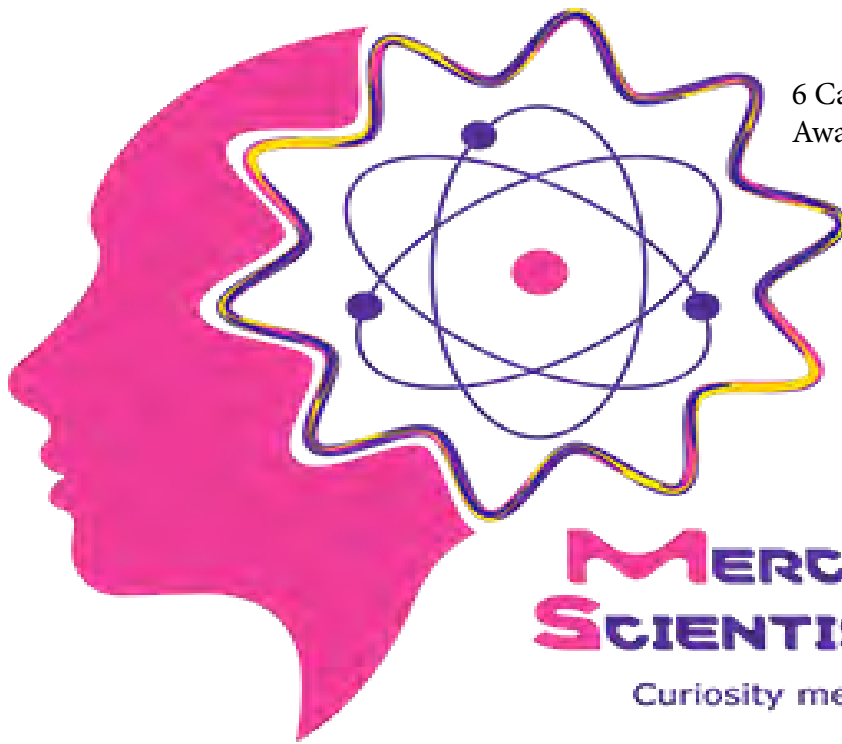
Duration: 5 Years

How to Apply

Nominations in the prescribed proforma should be submitted through online DBT portal (ePromis) (url: <http://www.dbtpromis.nic.in>) on or before **August 31st, 2019**. 3 hard copies of application along with requisite documents should be sent to Dr. Kakali Dey Dasgupta, Scientist "E", Department of Biotechnology, Ministry of Science & Technology, Room No.814, 8th Floor, Block-2, CGO Complex, Lodhi Road, New Delhi -110003.

For details of the award, nomination proforma and steps for online submission of nomination please log on to DBT website (www.dbtindia.gov.in)

Last Date of Submission of Nomination: 31st August, 2019



6 Cash award Rs 2,00,000 | Award Travel Award Rs 1,50,000

Key Dates

Submission Period 1st August – 15th Sept 2019

Review Period 16th Sept – 15th Nov 2019

Award Ceremony November 2019

**MERCK YOUNG
SCIENTIST AWARD**

Curiosity meets Opportunity

JAM 2020

JOINT ADMISSION TEST for M.Sc.



ORGANIZING INSTITUTE: IIT KANPUR

About JAM: National test for admission to M.Sc. (Two years), Joint M.Sc.-Ph.D., M.Sc.-Ph.D. Dual Degree, M.Sc.-M.S. (Research)/Ph.D. Dual Degree and other Post-Bachelor Degree programmes at IITs (Bhilai, Bhubaneswar, Bombay, Delhi, (ISM) Dhanbad, Gandhinagar, Guwahati, Hyderabad, Indore, Jodhpur, Kanpur, Kharagpur, Madras, Mandi, Palakkad, Patna, Roorkee, Ropar, Tirupati and (BHU) Varanasi) for the Academic Session 2020-21. JAM score will be used by IISc Bangalore for admission to Integrated Ph.D. programmes. JAM score will also be used by other centrally funded technical institutions like NITs, IEST Shibpur, SLIET Punjab and IISERs for admission to their programmes.

STRUCTURE AND MODE OF JAM 2020

JAM 2020 examination will be conducted ONLINE only. A candidate can appear in either one Test Paper or two Test Papers by paying an additional fee for the second test paper. Candidates opting to appear in two Test Papers must ensure that the opted Test Papers are not scheduled in the same session.

IMPORTANT DATES FOR JAM 2020	
05 September 2019	Start of ONLINE Registration and Application Process
08 October 2019	Closure of ONLINE Application Process
09 February 2020	JAM 2020 Examination
20 March 2020	Announcement of JAM 2020 Result

EXAMINATION CITIES AND TOWNS

Agartala, Agra, Ahmedabad, Asansol-Durgapur, Bareilly, Bengaluru, Bhopal, Bhubaneswar, Chennai, Coimbatore, Dehradun, Dhanbad, Dibrugarh, Ernakulam, Faridabad, Ghaziabad, Goa, Greater Noida, Gurugram, Guwahati, Hisar, Hubli, Hyderabad, Indore, Jaipur, Jalandhar, Jammu, Jind, Jodhpur, Jorhat, Kalyani, Kannur, Kanpur, Kharagpur, Kolkata, Kollam, Kottayam, Kozhikode, Kurukshetra, Lucknow, Madurai, Mangalore, Mohali, Moradabad, Mumbai, Nagpur, Nanded, Nasik, New Delhi, Noida, Palakkad, Patna, Prayagraj (Allahabad), Pune, Raipur, Ranchi, Roorkee, Shillong, Siliguri, Thiruvananthapuram, Thrissur, Tiruchirapalli, Tirunelveli, Tirupati, Vadodara, Varanasi, Vijayawada, Visakhapatnam and Warangal.

Note: The JAM 2020 Committee may add or drop any place as an examination city/town at its discretion.

INFORMATION BROCHURE AND APPLICATION PROCEDURE

Refer to <http://jam.iitk.ac.in> for downloading the Information Brochure and the details of application procedure.



GROUP/CATEGORY	FEE DETAILS	
	One Test Paper	Two Test Papers
Female (All Categories)/SC/ST/PwD	₹ 750/-	₹ 1050/-
All Others	₹ 1500/-	₹ 2100/-

PATTERN OF TEST PAPERS

JAM 2020 Test papers will be fully objective type, with three patterns of questions: (i) Multiple Choice Questions (MCQ), (ii) Multiple Select Questions (MSQ) and (iii) Numerical Answer Type (NAT) questions.

Joint Admission Procedure: Admissions to various academic programmes at IITs for the Academic Session 2020-21 shall be made based on the All India merit list of JAM 2020. Candidates who qualify in any test paper of JAM 2020 will be eligible to apply for admission to all the academic programmes corresponding to that test paper, provided they also satisfy the minimum educational qualifications and the eligibility requirements as specified by the institute(s) in which admission is sought. Admission shall be given in the order of merit depending on the number of seats available at the admitting institute(s). After the declaration of JAM 2020 result, qualified candidates should apply online at common admission portal (JOAPS) through the Organizing Institute (IIT Kanpur) specifying preferences for the programmes of their interest. Further details regarding admission, prescribed fees, etc. are available on the JAM 2020 website. Reservation policy is applicable as per the Government of India norms.

ELIGIBILITY REQUIREMENT AND MINIMUM EDUCATIONAL QUALIFICATIONS (MEQ) FOR ADMISSION

In the qualifying degree, the aggregate marks or CGPA/CPI without rounding-off (taking into account all subjects, including languages and subsidiaries, all years combined) should be at least 55% or 5.5 out of 10 for General/OBC (NCL)/EWS category candidates and 50% or 5.0 out of 10 for SC/ST and PwD category candidates (If CGPA/CPI is on a different scale, it would be linearly mapped to a scale on 10).

Refer to <http://jam.iitk.ac.in> for MEQ and other details. Proof of having passed the qualifying degree with the required eligibility as specified by the admitting institute should be submitted by September 30, 2020.

JAM 2020 SCHEDULE		
EXAM DATE	SESSION and TIME	TEST PAPERS
09 February 2020 (Sunday)	SESSION - I 9:30 am to 12:30 pm	Biotechnology (BT), Mathematical Statistics (MS) and Physics (PH)
	SESSION - II 2:30 pm to 5:30 pm	Chemistry (CY), Geology (GG) and Mathematics (MA)

CONTACT DETAILS of JAM OFFICES		
Institute	Website	E-Mail
IISc Bangalore	http://gate.iisc.ac.in	jam@gate.iisc.ac.in
IIT Bombay	http://gate.iitb.ac.in/jam	jam@iitb.ac.in
IIT Delhi	http://jam.iitd.ac.in	jam@admin.iitd.ac.in
IIT Guwahati	http://iitg.ac.in/gate-jam	jam@iitg.ac.in
IIT Kanpur	http://jam.iitk.ac.in	jam@iitk.ac.in
IIT Kharagpur	http://jam.iitkgp.ac.in	jam@adm.iitkgp.ac.in
IIT Madras	http://jam.iitm.ac.in	jam@iitm.ac.in
IIT Roorkee	http://iitr.ac.in/jam	jam@iitr.ac.in

GATE 2020

GRADUATE APTITUDE TEST IN ENGINEERING



Organising Institute

GATE qualification is required for admissions to Postgraduate Programmes (Master's and Doctoral) with MHRD and other Government Scholarships/Assistantships in Engineering/Technology/Architecture/Science. The GATE score is also used by some PSUs for their recruitment and by several universities in India & abroad for admissions.

GATE 2020 score will be valid for THREE YEARS from the date of announcement of results.

Eligibility

The following candidates are eligible to appear in GATE 2020:

Bachelor's degree holders in Engineering/Technology (4 years after 10+2 or 3 years after B.Sc./Diploma in Engineering/Technology) and those who are in the final year of such programmes.

Bachelor's degree holders in Architecture (Five years course)/ Naval Architecture (Four years course) and those who are in the final year of such programmes.

Bachelor's degree holders of Four-year programme in science (B.S.) and those who are in the final year of such programmes.

Master's degree holders in any branch of Science/Mathematics/Statistics/Computer Applications or equivalent and those who are in the final year of such programmes.

Holders of Four-year Integrated Master's degree (Post B.Sc.) in Engineering/Technology and those who are in the second or higher year of such programmes.

Holders of Five-year Integrated Master's degree or Dual Degree in Engineering/Technology and those who are in the fourth or higher year of such programmes.

Holders of Five-year Integrated M.Sc. or Five-year integrated B.Sc./M.Sc. Dual Degree and those who are in the final year of such programmes.

Candidates with qualifications obtained through examinations conducted by professional societies recognized by UPSC/AICTE as equivalent to B.E./B.Tech. Those who have completed section A of AMIE or equivalent of such professional courses are also eligible.

All Candidates must apply online. For application, visit the following URL:

<http://gate.iitd.ac.in>

Further details can be obtained by accessing any of the GATE/JAM portal website.



Important Dates

September 03, 2019	Opening of Online Registration & Application Form
September 24, 2019	Closing of Online Application Form
October 01, 2019	End of Extended Period for Online Application
February 01, 02, 08 & 09, 2020	Examination Dates
March 16, 2020	Announcement of Results

Examination Centres

GATE 2020 examination will be conducted in select cities & towns in India as well as in 516 cities abroad.

Examination Pattern

Examination for all the papers will be Computer Based Tests (CBT).

Application Fee

Examination Centres in India	On or before 24 th Sep 2019	During the Extended Period
SC/ST/PwD/Female Candidates	₹750	₹1250
All other Candidates	₹1500	₹2000
Examination Centres outside India (All Candidates)		
Addis Ababa, Colombo, Dhaka & Kathmandu	US\$50	US\$70
Dubai and Singapore	US\$100	US\$120



IIT Bangalore
gate.iitb.ac.in



IIT Bombay
gate.iitb.ac.in



IIT Delhi
gate.iitd.ac.in



IIT Guwahati
iitg.ac.in/gate-jam



IIT Kanpur
gate.iitk.ac.in



IIT Kharagpur
gate.iitkgp.ac.in



IIT Madras
gate.iitm.ac.in



IIT Roorkee
gate.iitr.ac.in