

## PATENTS FILED BY THE FACULTY DURING THE FINANCIAL YEAR 2016-17

1. Method and system for expansion of visibility range of an image.
2. A vtol unmanned aerial vehicle.
3. Tea maker.
4. Medicament and diagnosis for skin positive cancer.
5. A process of fabrication of optical lenses.
6. Process for preparation of super hydrophobic coating.
7. Process for the synthesis of monoliths as flow-through material obtained via sol-gel method.
8. An impaction based air sampling apparatus with a rotatory off-centric nozzle and a method thereof.
9. Automated interactive multi-parameter recorder and water sampler.
10. Electric mono wheel cycle (z0-e).
11. Multicolor interchangeable flaps and convertible form of bag.
12. Nano polishing of tubes using magnetorheological fluid.
13. An efficient writing tool for visually impaired.
14. Silver nanoparticles impregnated nanoporous carbon nanofiber platform for biosensor application.
15. Integrated system of transportation and storage of mammalian cells using cryotropic polymeric matrix and thereof.
16. A method for monitoring of bond wire degradation in insulated gate bipolar transistor.
17. Condition monitoring setup for long term reliability in fault recognition.
18. Enhanced electrochemical performance of waste tyre recycled activated carbon as an anode in li-ion battery.
19. A thin film transistor with high drain current induced by a trap-assisted electric double layer.
20. A wearable device for maintaining body temperature.
21. High performance thermoelectric material with high electrical conductivity and power factor and method of manufacturing the same.
22. Hybrid controlled arrangement to achieve linear electrical to acoustic conversion and method thereof.
23. A single-phase grid connected transformerless photovoltaic inverter.
24. School bag convertible to study table.
25. Micro-rna and methods to improve aav gene expression and vector production.
26. Samaritan (phototherapy unit).
27. A foldable wing design of an improved flapping wing aerial vehicle.
28. Antioxidant & antibacterial property of ha-ceo2-ag composite for bone tissue implant.
29. Breathalyzer for disease detection.
30. Gas sensors.
31. Trench-assisted fiber for fttth applications.
32. A fabrication method of biometric bi-convex optical lenses.
33. Milk and bread bicycle.
34. Milkman bicycle.
35. Bicycle for vegetable transport.
36. Parametric anisotropic brdf for 3d surface reconstruction and micro texture evaluation.
37. A method for fabricating microlens array of su-8 photoresist and microlens array thereof.
38. Cnt coated carbon fiber loaded rf resonant planar sensor for detection of hazardous gases in environment.
39. Fullerene nanoparticles and compositions thereof for inhibiting autophagy.
40. A process for manufacturing horseshoes.
41. A two-step method, for preparation of micron sized, nano-porous powder particles.
42. Method of fabrication based on controlled microstructure with refined and coarse grains.
43. Iron based amorphous alloys using high-phosphorous blast furnace grade hot metal.
44. Self-assembling hydrophobic encapsulating layer for perovskites for enhancing water and forenhancing water and moisture stability.
45. A solar energy harvester system.
46. Air sampler.
47. Air sampler.
48. Sensor for black carbon determination of air sampler.
49. A super hydrophobic coating composition and coating methods.
50. Integrated hybrid bio-artificial liver bioreactor design and thereof.
51. Integrated hybrid bio-artificial liver bioreactor design and thereof
52. A method of fabricating high-performance poly (vinylidene difluoride-trifluoroethylene), p (vdf-trfe) films.

## PATENTS GRANTED DURING THE FINANCIAL YEAR 2016-17

1. Poly silicon a moled self-biased cascode pixel circuit with highly linear transfer characteristics.
2. A carbon nano tubes coated long fiber and a process for preparation thereof.
3. Design for disability: a waist wearable for visually challenged for indoor navigation.
4. Business purpose utility vehicle-vegetable cart.
5. A novel functionally graded polymer(s)/polymeric nano composite(s) [fgp(s)/fgpnc(s)] having glass transition temperature variation and a process for preparation thereof.
6. Functionally graded polymer nano composites/composites having cross linking density variation and their manufacture.
7. Synthesis of stable nano crystalline iron carbides by reaction milling in a dual-drive planetary mill.
8. An improved organic optoelectronic device.
9. Polymer matrix scaffold and process for preparation thereof.
10. Business purpose utility vehicle-saloon.

## TECHNOLOGY LICENSED DURING THE FINANCIAL YEAR 2016-17

1. "PM 1 Sampler" Technology Transfer To Envirotech Instruments Pvt Ltd.

## INTERNATIONAL PATENTS DURING THE FINANCIAL YEAR 2016-17

1. Integrated Hybrid Bio-artificial Liver Bioreactor Design And Thereof.
2. Integrated Hybrid Bio-artificial Liver Bioreactor Design And Thereof
3. A Method Of Fabricating High-performance Poly (vinylidene difluoride-trifluoroethylene), P(vdf-trfe) Films

### Memorandum of Understanding:

During the year 2016-17, IIT Kanpur strengthened its relations with many national and International institutes and organizations through research collaborations and signed several Memorandum of Understanding. During the year, the following institutes/universities /organizations have joined hands with IIT Kanpur for the purpose of research work in the diverse fields of science and technology. Some of such organizations are:

1. Department of Biotechnology, New Delhi, for the project titled, "Development of Transition Metal-doped Carbon Nanofiber-based Biosensor for the detection of Glucose, Cholesterol and Creatinine in Human Blood."
2. Department Of Biotechnology, New Delhi, for the project titled, "Biocompatible Delivery and Nanocarrier System."
3. IIT Bombay, Mumbai and Others, for National Carbonaceous Aerosols Programme WGIII: Carbonaceous Aerosol Emissions, Source apportionment and Climate effects."
4. Semi-Conductor Laboratory, Dept. Of Space, SAS Nagar, for joint collaboration, exchange of staff, faculty and student exchange.
5. Indian Institute of Remote Sensing, Dehradun, the consultancy for UAV Data Acquisition and Processing.
6. Department of Electronics and Information Technology, Ministry of Communication and Information Technology, Government of India, for a scheme entitled, "Scheme for Financial Assistance for setting up of Electronics and ICT Academies."
7. Department Of Biotechnology, New Delhi, for the project titled, "Role of neural oscillations in the processing of behaviorally salient odors by the mosquito brain."
8. Virginia Polytechnic Institute and State University, USA, for extension of a research agreement.
9. Commonwealth of Learning, Canada, for developing COL's MOOC4DEV portal.
10. University of Southampton, UK, for amendment to the agreement titled, "Assessing Health, Livelihoods, Ecosystem Services and Poverty Alleviation in Populous Deltas."
11. Ministry of Road Transport and Highways (MoRTH), New Delhi, for the project titled, "Employment creating effects of highways construed".
12. Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, for implementation of scheme national initiative for setting up of design innovation centers.
13. Environment Protection Training and Research Institute, Hyderabad, to collaborate in training, applied research, joint collaboration and consultancy in the areas of Urban River Management, Sanitation.
14. Department of Biotechnology, New Delhi, for the project titled, "Mechanism of Antibiotic Resistance by Class-C Beta-Lactamase and NDM-1".
15. Central Power Research Institute (CPRI), Bangalore, for the project titled, "Development of control strategies for grid connected PV system utilizing the MPPT and reactive power capability".
16. Ministry of Water Resources River Development and Ganga Rejuvenation (MoWR), for Center for Ganga River Basin Management and Studies.
17. University of California Berkeley, USA, for the project titled, "Modelling Advanced FDSOI for IC Design".
18. Georgia Institute of Technology, USA, for the project titled, "Crowdsourcing Water Quality: using mobile technology and rapid

microbiological tests to assess drinking water risks in rural India”.

19. ICIMOD, Nepal, an addenda to the letter of agreement for the project Titled, “Sediment Dynamics and sediment connectivity in the Koshi Basin: implications for river hazards” for no cost extension with change in budget line.
20. International Center for Research on Women (ICRW), New Delhi, for presentation of research proposal to ICRW staff, Collection of data as per research design, Data analysis, Regular update to ICRW staff, Preparation of manuscripts for publication.
21. Department of Biotechnology, New Delhi, for “Targeted delivery of Human coagulation factor VII in myeloid compartment of haematopoietic stem cells for gene therapy of hemophilia B by Adeno-associated virus(AAV) vectors”
22. Council Of Science and Technology UP, Lucknow, to conduct CSTUP Online Examination for Class 10 and 12 pass students of UP.
23. Society for Research and Initiatives for Sustainable Technologies and Institutions, Ahmedabad, the GYTI Award for “Development of portable device based on polarized fluorescence for detection of cervical pre-cancer.”
24. Society for Research and Initiatives for Sustainable Technologies and Institutions, Ahmedabad, the GYTI Award for “A Compact Microwave Sensor for Characterization of Radomes and Dielectric Signature Detection of Materials in 3G and 4G GSM Bands.”
25. Council of Scientific and Industrial Research (CSIR), New Delhi, for collaborative research programs in specific fields of Interest, Student exchange programs, Faculty exchange programs and Submission of joint projects.
26. Natural Environment Research Council (NERC) Centre for Ecology & Hydrology, UK, the opportunities for bilateral exchange of research scientists, Opportunities for the appointment of joint staff and studentships and opportunities for the development of collaborative research projects and programmes.
27. The Regents of the University of California, Berkeley, for Subcontract Agreement SA9233.
28. Tel Aviv University (TAU), Israel, to facilitate bi-lateral academic scientific relationship and to develop cooperative research and teaching projects in selected fields.
29. NYU Tandon School of Engineering, USA, to facilitate bi-lateral academic scientific relationship and to develop cooperative research and teaching projects in selected fields.
30. Harcourt Butler Technical University, Kanpur, to facilitate interdisciplinary design-focused education, research and entrepreneurial activities in order to create commercial opportunities and build partnership between academics and industry.
31. Indian Space Research Organization (ISRO), Bengaluru, for extension of an MoU with ISRO.
32. BHABHA Atomic Research Centre Department of Atomic Energy, Mumbai, for the project titled “Studies of Fire Propagation, Suppression and Scavenging with Associated Thermal Hydraulic Aspects in Multiple Compartments”.
33. Indian Institute of Technology Kharagpur, Kharagpur and Indian Institute of Technology Bombay, Mumbai, for an IMPRINT project titled “FMSAFE: A Networked Centre for Formal Methods in Validation and Certification Procedures for Safety-Critical ICT Systems”.
34. Indira Gandhi National Tribal University, Amarkantak, for enhancing and deploying the EdRP (Educational Resource Planning) products of relevance in Indira Gandhi National Tribal University.
35. Centre National De La Recherche Scientifique, France, Ecole Normale Supérieure Paris, France, Université Pierre Et MarieCurie Paris 6, France, Université Paris Diderot Paris 7, France, The Chancellor, Masters and Scholars of the University of Cambridge, United Kingdom, Helmholtz-Zentrum Dresden-Rossendorf, Germany, Eidgenössische Technische Hochschule Zurich, Switzerland and University of Wisconsin-Madison, USA, an agreement for the creation of the International Scientific Coordination Network (GDMI) “DYNAMO”.

#### **During the year 2016-17, Memorandum of Understanding have also been signed with many companies**

1. Renault Nissan Technology and Business Centre India Pvt. Ltd., Chennai, for the project titled, “Development of Unmanned Aerial Vehicles (UAV) Aided Driver Assistance System.”
2. Renault Nissan Technology and Business Centre India Pvt. Ltd., Chennai, for the project titled, “Procurement of DJI Matrice 100 Unmanned Aerial Vehicles for Project 'Unmanned Aerial Vehicles (UAV) Aided Driver Assistance System”.
3. Shell India Markets Private Limited, Bangalore, amendment to an agreement titled, “Catalytic wet air oxidation of SMPO wastewater under gas-liquid flow conditions using novel carbon-based beads in-situ dispersed with transition metal nanoparticles.”
4. Karnataka State Electronics Development Corporation, Bengaluru, to collaborate and assist in technical knowhow.
5. Sahasra Electronics Private Ltd., New Delhi, for the project titled, “Prototype White Organic Light Emitting Diode based lighting tiles.”
6. Unilever Industries Pvt Ltd., Mumbai, for the project titled, “Lubricating Fluid coated Slippery Surfaces and its Application in Sanitary Wares.”

7. NTPC Limited, New Delhi, to collaborate and jointly work on projects in topics of mutual interest and develop products.
8. Oil And Natural Gas Corporation, New Delhi and Indian Institute of Technology Bombay, for the project titled, "An Organometallic fingerprinting proxy to locate shale oil pools."
9. Tata Steel Ltd., Mumbai, to collaborate for the project titled, "Fe-Based multicomponent glass composition using the BF metal to the maximum amount and use of minor addition of other Ferro-alloys to tune the composition."
10. Samsung India Electronics Private Limited, New Delhi, amendment to the agreement titled, "Holistic Scene Understanding"
11. Tata Steel Limited, Mumbai, for the project titled, "Characterization of Particle Size And Shape Factor Distribution of the Blast Furnace Feed And Simulation of The Flow and Packing of The Components."
12. Intel Technology Pvt. Limited, Bengaluru, for the project titled, "Cross-Layer Optimization Techniques in Video Streaming Over Wireless Fading Networks."
13. Chain Electronics Pvt. Ltd., Gandhinagar, for the project titled, "Segmented OLED display on glass."
14. Mitsubishi Heavy Industries Limited, Japan, for the project titled, "High-speed optimization algorithm for large scale job-shop scheduling."
15. Boeing Research and Technology, USA, for the project titled, "Additive Manufacturing of Functionality Engineered Materials."
16. Backer Technologies GmbH, Germany, for cooperation in field of Reactor Safety Research.
17. The Boeing Company, USA, for the project titled, "Intelligent Cyber Machine System for Manufacturing Equipment and process".
18. Medical Device Development Centre of Daegu-Gyeongbuk Medical Innovation Foundation (DGMIF) South Korea, to collaborate in research and business development performance of medical devices.
19. Nano Kernel Limited, Bangalore, the consultancy for Development of Fleet Planning and scheduling System for public transport.
20. Navin Saxena Research & Technology Private Limited, Mumbai, for the project titled, "NSRT-005a-Development of Novel Synthesis Route of Noroxymorphone & Apomorphine".
21. Hitachi India Pvt. Ltd., New Delhi, for the project titled, "In-Vehicle vision applications".
22. Ikan Innovations and Technologies Pvt. Ltd., Lucknow, for an Umbrella MOU to collaborate, Commercialization of Technologies, product and services of IIT Kanpur.
23. L&T Technologies Services Limited, Vadodara, for collaboration for promotion of education, research and innovation in Granular Flow Analysis, Multibody Dynamics, Smart Grid System, Vibration and Noise Control and Flexible Electronics.
24. Kohler Co., USA, a consulting agreement for developing the next generation CLASS wastewater treatment system in conjunction with our Gates Foundation project.
25. CEFIPRA, France, for the guidelines on protection and exploitation of Intellectual Property Rights emanated from the collaborative Research Programme of CEFIPRA.
26. CRDF Global, USA, for Nuclear Security Workshop Support.
27. Saint-Gobain Research India Private Limited, Chennai, for testing services entitled "Seismic Testing of Non- structural Plasterboard Suspended Ceiling".
28. Emerson Network Power India Ltd, Thane, for collaboration for the Solar Project named- "GaNHEMT Based Grid Solar PV Inverter".
29. Intel Technology India Private Ltd, Bangalore, to perform the research on "High-ILP optimized Core and SOC microarchitecture".
30. TATA Advanced Systems Limited, New Delhi, for design work on projects related to aerodynamics of UAV.
31. Indian Energy Exchange Limited, New Delhi, for extension of Memorandum of Understanding through February 2020.
32. Aeron Systems Pvt Ltd, Pune, to work on development projects including Flight characterization of UAV sub-systems using facilities.
33. Research and Development Centre for Iron and Steel, Ranchi, to perform the research on "Develop of mixed-gas fired flat-flame burner at RDCIS Complex, Ranchi".
34. Unilever Industries Private Limited, Mumbai, to perform the research on "Understanding effect of composition, processing and ageing of cleaning compositions on rheology."
35. BSE Limited, Mumbai, for Cyber Lab for research and development activities in the financial markets and financial sector.
36. Evalueserve.com Pvt. Ltd, Gurgaon, to perform the research on 'Algorithms Design for Sentiment and Text Analysis."
37. The Tata Power Company Limited, Mumbai, for development of products and solutions in areas as fail safe computer architecture, algorithms, communications, signal processing, pattern recognition, energy, security.
38. The Boeing Company, USA, to perform work in accordance with Scope of Work titled "Supplier Statement of Work for AFC High Life Study".
39. Invention Development Management company, LLC, USA, for fabrication of large scale reusable

bilayer adhesive samples using cost effective materials for wooden joints.

40. The University of Southern Denmark, Odense University Hospital, Denmark, Aarhus University, Denmark, Centre for Cellular & Molecular Biology (CCMB), Hyderabad, Sree Chithira Tirunal Institute of Medical Science and Technology (SCTMST), Thiruvananthapuram and Christian Medical College (CMC), Vellore, to perform the research on "Indo-Danish Centre for MUSculo-Skeletal Stem Cell Targeting".
41. FaceFirst, Inc, USA, for software development related to the development of facial recognition algorithm and such other projects.
42. Murata Manufacturing Co., Ltd, Japan, to perform the research on "Flexible Multi point temperature sensing system & Algorithm."
43. Lohia Corp Limited, Kanpur, for investigation of the Microstructural, Thermal and Mechanical properties of Polypropylene, Polyethylene and Polyurethane.
44. Navin Saxena Research & Technology Private Limited, Mumbai, for the project titled "NSRT-005b- Development of Novel de novo Synthesis Route of Noroxymorphone".
45. Akvo Development Tools and Services Pvt. Ltd, New Delhi and Eco Friends Society, Kanpur, for an IMPRINT project titled "Development of a smartphone camera-based sensor for detection and remediation of chromium pollution in water.
46. Sensebird Solutions Pvt. Ltd, Noida, to cooperate with each other for development of products and solutions in areas such as Unmanned Aerial Vehicle, Manned Aircraft, Multispectral sensors, etc.
47. Applied Materials India Private Limited, Bangalore, for the programs titled "Development of Flexible IGZO TFT Technology", "Development of non-volatile memory based on PVDF-TrFE FeFET" and "Development of ethylene (and other gas) sensors for detection of food spoilage".
48. Amatra Digital Gadgets Pvt Ltd, Bengaluru, to study the possibility of commercialization of products based on functional Ink technology with NCFlexE.
49. Tata Consultancy Services Ltd, Chennai, for the project titled "Development of an Autonomous Mobile Manipulator System for Ware-house Applications: Stowing and picking".
50. Ganesh Shankar Vidyarthi Memorial Medical College, Kanpur and Regency Hospital Ltd., Kanpur, for an IMPRINT project titled "In Vivo Testing and Up-gradation of Prototype Optical Probe for Cervical and Oral Precancer Detection".
51. CL Infotech Pvt Ltd., Bangalore, collaborates to offer industry aligned certificate programs in Smart Cities, Innovative Housing Technology, Smart Power Grid Systems, Renewable Energy Management and Digital Technology.
52. VITO NV, Belgium, to collaborate in establishing a Europecoo-Desk/ Chapter for Kanga in Brussels/ Antwerp and the Desk's functions are to facilitate and accelerate access and availability of relevant innovative and cost-effective technologies that have application in cleaning up Ganga river in India and to facilitate dialogue with European Commission and its agencies such as DG-Environment and others.
53. M/s Golden Star Technical Services Private Limited, Maharashtra, Institut National Des Sciences Appliquees, France and Thales Avionics SAS, France, for the project titled "Development of Loop Heat Pipe for Avionics and Terrestrial Applications".
54. Center For Curiosity, New York, for investigating the scope of knowledge-based services in the social enterprise ecosystem.
55. Oxford Policy Management Limited, United Kingdom, for scoping study to manage the slit in the Kosi River of Bihar.

**A list of a major sponsored and consultancy projects sanctioned during the financial year 2016-17 is provided below.**

### **Sponsored projects**

#### **A. National Projects**

1. BIFUNCTIONAL APPROACH TO SMALL MOLECULE ACTIVATION: TOWARDS SUSTAINABLE PROCESSES AND PRODUCTS, FUNDED BY DEPARTMENT OF ATOMIC ENERGY, SANCTIONED AMOUNT RS. 11200000.
2. CENTRE FOR GANGA RIVER BASIN MANAGEMENT, FUNDED BY MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION, SANCTIONED AMOUNT RS. 96000000.
3. PPP MODE INDUSTRY PROJECT (PROTOTYPE DEVELOPMENT FUND), FUNDED BY SAHASRA ELECTRONICS PRIVATE LTD., SANCTIONED AMOUNT RS. 11735286.
4. NATIONAL CARBONACEOUS AEROSOLS PROGRAMME (NCAP) WORKING GROUP-III PROJECT, FUNDED BY MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, SANCTIONED AMOUNT RS. 93205000.
5. PPP MODE INDUSTRY PROJECTS (PROTOTYPE DEVELOPMENT FUND), FUNDED BY MURATA MANUFACTURING COMPANY, SANCTIONED AMOUNT RS. 10560000.
6. INVENT INCUBATOR, FUNDED BY DFID

- EXECUTOR VILGRO INNOVATION FOUNDATION, SANCTIONED AMOUNT RS. 121600000.
7. AGAROSE BASED WOUND DRESSING, FUNDED BY DEPARTMENT OF SC.& TECHNOLOGY, SANCTIONED AMOUNT RS. 17823285.
  8. TEACHING LEARNING CENTRE FOR INTERNET-OF-THINGS, FUNDED BY MIN. OF HUMAN RESOURCE DEVELOPE, SANCTIONED AMOUNT RS. 18240000.
  9. OPTICAL DIAGNOSTICS OF TRANSPORT PHENOMENA DURING GAS HYDRATE FORMATION AND DISSOCIATION, FUNDED BY ONGC, SANCTIONED AMOUNT RS. 10511000.
  10. ENGINEERING OF SECURITY HARDENED CRYPTOGRAPHIC PROTOCOLS FOR CRITICAL NATIONAL INFRASTRUCTURE, UNDER UAY, FUNDED BY DEPARTMENT OF SC. & TECHNOLOGY, SANCTIONED AMOUNT RS. 63313000.
  11. INTEGRATION AND ENABLEMENT OF 0.18 MICRON RF-SOI TECHNOLOGY FOR ANALOG MIXED-SIGNAL APPLICATIONS, FUNDED BY DEPARTMENT OF SC.& TECHNOLOGY, SANCTIONED AMOUNT RS. 13426040.
  12. RUSTAM-II (VER 4.0 CONFIGURATION) WIND TUNNEL MODEL, DESIGN, FABRICATION & TESTING, FUNDED BY AERONAUTICAL DEVELOPMENT ESTABLISHMENT, SANCTIONED AMOUNT RS. 17640000.
  13. FIST PROGRAM-2016, FUNDED BY DEPARTMENT OF SC.& TECHNOLOGY, SANCTIONED AMOUNT RS. 38000000.
  14. INSTALLATION OF A PILOT PLANT OF 10 KLD CAPACITY.....ON ACID MODIFIED SOIL, FUNDED BY DEPARTMENT OF SC.& TECHNOLOGY, SANCTIONED AMOUNT RS. 11903000.
  15. STUDIES OF FIRE PROPAGATION, SUPPRESSION AND SCAVENGING WITH ASSOCIATED THERMAL HYDRAULIC ASPECTS IN MULTIPLE COMPARTMENTS, FUNDED BY BHABHA ATOMIC RESEARCH CENTRE, SANCTIONED AMOUNT RS. 19307000.
  16. DECIPHERING THE STRUCTURAL ROLE OF GLYCOGEN IN NEURONAL AUTOPHAGY, AND NEURODEGENERATION, FUNDED BY UNIVERSITY GRANTS COMMISSION, SANCTIONED AMOUNT RS. 17572800.
  17. NIDHI PRAYAS, FUNDED BY DEPARTMENT OF SC. & TECHNOLOGY, SANCTIONED AMOUNT RS. 17000000.
  18. IMPRINT INDIA INITIATIVE (MAIN), FUNDED BY MIN. OF HUMAN RESOURCE DEVELOPE, SANCTIONED AMOUNT RS. 350026000.
  19. NATIONAL INTERDISCIPLINARY CENTER FOR CYBER SECURITY AND CYBER DEFENSE OF CRITICAL INFRASTRUCTURES, FUNDED BY SCIENCE & ENGINEERING RESEARCH BOARD, SANCTIONED AMOUNT RS. 144380200.
  20. DESIGN AND DEVELOPMENT OF ADAPTIVE INTELLIGENT PHMR FOR FUEL TRANSPORTATION SYSTEMS MHRD (DST) UAY, FUNDED BY MIN. OF HUMAN RESOURCE DEVELOPE, SANCTIONED AMOUNT RS. 36,500,000.
  21. ESTABLISHMENT OF RESEARCH PARK, FUNDED BY INDIAN INSTITUTE OF TECHNOLOGY KANPUR, SANCTIONED AMOUNT RS. 700000000.
- B. International Projects**
1. ADDITIVE MANUFACTURING OF FUNCTIONALLY ENGINEERED MATERIALS, FUNDED BY BOEING, SANCTIONED AMOUNT RS. 3013000.
  2. CODING OF INNATE OLFACTORY PREFERENCES IN THE MOSQUITO BRAIN, FUNDED BY WELLCOME TRUST DBT, SANCTIONED AMOUNT RS. 34909474.
  3. CORESAFE: A FORMAL APPROACH AGAINST CODE REPLACEMENT ATTACKS ON CYBER PHYSICAL SYSTEMS, FUNDED BY U.S. AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, SANCTIONED AMOUNT RS. 3454477.
  4. JOINT RESEARCH STUDY BETWEEN AALTO UNIVERSITY & IIT KANPUR ON RECYCLING OF ASPHALT MATERIALS IN ROAD CONSTRUCTION, JOINTLY FUNDED BY AALTO UNIVERSITY AND INDIAN INSTITUTE OF TECHNOLOGY KANPUR, SANCTIONED AMOUNT RS. 250000.
  5. MODELING OF ADVANCED BULK AND SOI MOSFETS, FUNDED BY BERKELEY DEVICE MODELING CENTER, SANCTIONED AMOUNT RS. 2345000.
  6. CROWDSOURCING WATER QUALITY: USING MOBILE TECHNOLOGY AND RAPID MICROBIOLOGICAL TEST TO ASSESS DRINKING WATER RISKS IN RURAL INDIA, FUNDED BY GEORGIA INSTITUTE OF TECHNOLOGY, SANCTIONED AMOUNT RS. 3338497.
- Consultancy Projects**
- A. National Projects**
1. ANALYSIS OF MERIT ORDER OF POWER SCHEDULING AND DESPATCH, FUNDED

- BY UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, SANCTIONED AMOUNT RS. 500000.
2. ANALYSIS OF WASTEWATER SAMPLES UNDER NAMAMI GANGA, FUNDED BY VIMTA LABS LIMITED (VIMTA), SANCTIONED AMOUNT RS. 2425969.
  3. ANALYSIS OF WASTE WATER SAMPLE UNDER NAMAMI GANGE, FUNDED BY PRAGATI LABS AND CONSULTANT PVT.LTD (PLACPL), SANCTIONED AMOUNT RS. 1209406.
  4. IMPROVING RHEOLOGICAL BEHAVIOUR OF AGRO-PRODUCTS, FUNDED BY UNITED PHOSPHORUS LIMITED, SANCTIONED AMOUNT RS. 750000.
  5. LUBRICATING FLUID COATED SLIPPERY SURFACES AND ITS APPLICATION IN SANITARY WARE, FUNDED BY UNILEVER LIMITED, SANCTIONED AMOUNT RS. 1860625.
  6. TECHNICAL VETTING OF ELECTRICAL ESTIMATES, FUNDED BY UPSTATE INDUSTRIAL DEV.CORPORATION, SANCTIONED AMOUNT RS. 2290000.
  7. UNDERSTANDING THE OVD PROCESS FOR OPTICAL FIBER MANUFACTURING AND BASIC ANALYSIS USING THEORETICAL AND NUMERICAL MODELS, FUNDED BY STERLITE TECHNOLOGIES LTD, SANCTIONED AMOUNT RS. 2634000.
  8. VIBRATION BASED CONDITIONING MONITORING & LIFE ESTIMATION OF AN AERO ENGINE BLADES & BLADED DISCS, FUNDED BY DEFENCE R & D ORGANISATION, SANCTIONED AMOUNT RS. 4060000.
  9. FIELD TESTS AT THE LOHIA COLONY OF RBI PATNA, FUNDED BY RBI, SANCTIONED AMOUNT RS. 572500.
  10. WIND TUNNEL MODEL STUDY OF BRIDGE NO.44, 53 & 65 IN TUPUL-JIRIBAM SECTION OF N.F. RAILWAY IN MANIPUR, FUNDED BY STUP CONSULTANTS PVT. LTD, SANCTIONED AMOUNT RS. 4500000.
  11. COMPOSITE REUSABLE ADHESIVE SAMPLES WITH COST EFFECTIVE MATERIALS, FUNDED BY INVENTION DEVELOPMENT MANAGEMENT COMPANY, SANCTIONED AMOUNT RS. 897800.
  12. HIGH SPEED OPTIMIZATION ALGORITHM FOR LARGE SCALE JOB SHOP SCHEDULING, FUNDED BY MITSUBISHI HEAVY INDUSTRIES LTD, SANCTIONED AMOUNT RS. 4647000.
  13. WIND TUNNEL STUDY OF 275M HIGH SINGLE FLUE RCC CHIMNEY FOR 1X660MW, FUNDED BY TOSHIBA, SANCTIONED AMOUNT RS. 2495500.
  14. STUDIES ON CONSTRUCTION MATERIALS: ANALYSIS & DESIGN, FUNDED BY MISCELLANEOUS, SANCTIONED AMOUNT RS. 1400000.
  15. WIND TUNNEL TESTING OF NDCT OF TANDA TPS, FUNDED BY LARSEN & TOUBRO LIMITED, SANCTIONED AMOUNT RS. 2519000.
  16. VISUAL INSPECTION FOR PERFORMANCE EVALUATION OF REHABILITATED FLYOVER AT DHOLPUR ON NH-3, FUNDED BY NATIONAL HIGHWAY AUTHORITY OF INDIA, SANCTIONED AMOUNT RS. 690000.
  17. CONSULTANCY SERVICES FOR RAISING OF ASH DYKE HEIGHT AT STPS, SARNI, FUNDED BY M.P.POWER GENERATING COMPANY LTD., SANCTIONED AMOUNT RS. 1145000.
  18. WT MODEL STUDY FOR 1X800MW KOTHAGUDEM U#12, FUNDED BY PAHARPUR COOLING TOWERS LIMITED, SANCTIONED AMOUNT RS. 1600000.
  19. WT MODEL STUDY OF RCC CHIMNEY FOR 1X800 MV GSESL WANAKBORI STPP UNIT NO.8, FUNDED BY BHARAT HEAVY ELECT LTD, SANCTIONED AMOUNT RS. 1545750.
  20. WT MODEL STUDY OF RCC CHIMNEY FOR 3X660 MW NORTH KARANPURA STPP, STG-1, FUNDED BY BHARAT HEAVY ELECT LTD, SANCTIONED AMOUNT RS. 1545750.
  21. HERBARIUM REPORT SOFTWARE EVOLVING & RELATED SYSTEM REORGANIZATION, FUNDED BY NATIONAL BOTANICAL RESEARCH INSTITUTE, SANCTIONED AMOUNT RS. 2500000.
  22. IN-VEHICLE VISION APPLICATIONS, FUNDED BY HITACHI INDIA PVT. LTD, SANCTIONED AMOUNT RS. 1415938.
  23. DEVELOPMENT OF AN AUTONOMOUS MOBILE MANIPULATOR SYSTEM FOR WARE-HOUSE APPLICATIONS: STOWING AND PICKING, FUNDED BY TATA CONSULTANCY SERVICES, SANCTIONED AMOUNT RS. 4995000.
  24. DESIGN & DEVELOPMENT OF SINGLE FLUID ATOMIZERS FOR MIST GENERATION, FUNDED BY DEFENCE R & D ORGANISATION, SANCTIONED AMOUNT RS. 999000.
  25. EMPLOYMENT CREATING EFFECTS OF HIGHWAYS CONSTRUCTED, FUNDED BY MINISTRY OF ROAD TRANSPORT & HIGHWAYS, SANCTIONED AMOUNT RS. 2479437.
  26. THERMODYNAMIC BASED MODELING FOR CONVERSION OF HIGH 'P' CAST IRON TO FE BASED METALLIC GLASS POWDER....., FUNDED BY TATA STEELS

- LTD., SANCTIONED AMOUNT RS. 1150000.
27. VIHING WT AND STD DESIGN: HARYANA CENTRAL UNIVERSITY, FUNDED BY NATIONAL BUILDINGS CONSTRUCTION CORPORATION LIMITED, SANCTIONED AMOUNT RS. 517500.
  28. DESIGN OF 0.38 MM REVOLVER, FUNDED BY SMALL ARMS FACTORY, SANCTIONED AMOUNT RS. 2496938.
  29. ADVISEMENT ON FLEET PLANNING & SCHEDULING SYSTEM FOR PUBLIC TRANSPORT, FUNDED BY NANO KERNEL LTD., SANCTIONED AMOUNT RS. 828000.
  30. WIND TUNNEL TEST OF 20 SIDED POLYGONS, FUNDED BY BAJAJ ELECTRICALS LTD., SANCTIONED AMOUNT RS. 690000.
  31. WIND TUNNEL TESTING OF PANTOGRAPH MODEL NO. WBL 85., FUNDED BY SCHUNK METAL & CARBON (INDIA) PVT. LTD., SANCTIONED AMOUNT RS. 603750.
  32. VETTING OF STRUCTURAL DESIGN AND DRAWINGS OF PROPOSED CONSTRUCTION OF RESIDENCY A1, A2 & B AT O-BLOCK KIDWAI NAGAR, KANPUR, FUNDED BY KANPUR DEVELOPMENT AUTHORITY, SANCTIONED AMOUNT RS. 920000.
  33. COMPREHENSIVE ADVANCED ROTOCRAFT MODELING AND ANALYSIS FOR CONTROL LAW DEVELOPMENT FOR THE ROTARY UAV, FUNDED BY AERONAUTICAL DEVELOPMENT ESTABLISHMENT, SANCTIONED AMOUNT RS. 997625.
  34. CST UP SCIENCE TALENT SEARCH TEST, FUNDED BY COUNCIL OF SCIENCE & TECHNOLOGY, SANCTIONED AMOUNT RS. 278806000.
  35. UNDERSTANDING EFFECT OF COMPOSITION, PROCESSING AND AGEING OF CLEANING COMPOSITIOS ON RHEOLOGY, FUNDED BY UNILEVER LIMITED, SANCTIONED AMOUNT RS. 1322500.
  36. WIND TUNNEL TESTING OF VSSC PSLV MODEL, FUNDED BY VSSC, SANCTIONED AMOUNT RS. 1891750.
  37. STUDY TO MINIMIZE OVER VOLTAGE AND INRUSH CURRENT OF THE TRANSFORMERS DURING CONNECTING OF GRID TIED SOLAR PV PLANT, FUNDED BY NTPC, SANCTIONED AMOUNT RS. 2898000.
  38. DESIGN AND DEVELOPMENT OF SMART SOLAR INVERTER FOR GRID PRIMARY FREQUENCY CONTROL WITH DROOP CHARACTERISTICS AND INTEGRATED DC SUPPLY, FUNDED BY NTPC, SANCTIONED AMOUNT RS. 6072000.
  39. DEVELOPMENT OF MIXED-GAS FIRED FLAT-FLAME BURNER AT RDCIS COMPLEX, RANCHI, FUNDED BY STEEL AUTHORITY OF INDIA, SANCTIONED AMOUNT RS. 1500000.
  40. DESIGN AND DEVELOPMENT OF CONTROL AND PROTECTION FOR HYBRID RENEWABLE INTEGRATION, FUNDED BY NTPC, SANCTIONED AMOUNT RS. 9324000.
  41. USE OF SYNCHROPHASOR DATA FOR TUNING OF POWER SYSTEM STABILIZER AND ON-LINE ESTIMATION OF GENERATOR PARAMETERS, FUNDED BY NTPC, SANCTIONED AMOUNT RS. 6331500.
  42. AERIAL AND MOBILE LODAR SERVEY OF CHANDIGARH, FUNDED BY CHANDIGARH ADMINISTRATION, SANCTIONED AMOUNT RS. 679219.
  43. STUDY OF SETTLEMENT FAILURE OF AT-GRADE THREE CELL BOX-TYPE BRIDGE & ITS REPLACEMENT BRIDGE ON NH-547 AT RAMAKONA, MP, FUNDED BY NATIONAL HIGHWAY AUTHORITY OF INDIA, SANCTIONED AMOUNT RS. 3450000.
  44. SEISMIC TESTING OF NON-STRUCTURAL PLASTER BOARD SUSPENDED CEILING SYSTEMS, FUNDED BY SAINT GOBAIN RESEARCH INDIA, SANCTIONED AMOUNT RS. 2760000.
  45. WIND TUNNEL TESTING OF VSSC RLV 1:50 MODEL (IST & IIND PHASE), FUNDED BY VSSC, SANCTIONED AMOUNT RS. 3660574.
  46. USE OF UAV TECHNOLOGY FOR PREPARATION OF TOPOGRAPHICAL, GEOMORPHOLOGICAL AND GEOLOGICAL MAP.....ODISHA STATE., FUNDED BY MINERAL EXPROATION CORPORATION LIMITED, SANCTIONED AMOUNT RS. 3703000.
  47. CONSULTANCY FOR THE STRUCTURAL ANALYSIS AND SAFETY OF CANTEEN BUILDING (ALIMCO) KANPUR FUNDED BY ENGINEERING PROJECT (INDIA) LTD., SANCTIONED AMOUNT RS. 596563.
  48. EVALUATION OF EXISTING 2100 MM DIAMETER PRESTRESSED CONCRETE PIPE FEEDER MAIN LAID UNDER JNNURM AND ITS RETROFIT, FUNDED BY U P JAL NIGAM, SANCTIONED AMOUNT RS. 1980500.
  49. WIND TUNNEL TESTING OF HIGH REACH PANTOGRAPH. FUNDED BY STONE INDIA LIMITED, KOLKATA, SANCTIONED AMOUNT RS. 637500.
  50. SITE VISIT AND CONSULTANCY SERVICE- IMT MARUTHI, ROTHAK, FUNDED BY L&T CONSTRUCTION, SANCTIONED



AMOUNT RS. 71875.

51. FLIGHT TESTING OF UVA PLATFORMS, FUNDED BY AERON SYSTEMS PVT. LTD., SANCTIONED AMOUNT RS. 9249745.
52. DEFECT INVESTIGATION OF PITTING PROBLEM IN 12MM MORTAR, FUNDED BY INDIAN ORDINANCE FACTORY, SANCTIONED AMOUNT RS. 661250.
53. WIND TUNNEL TEST FOR 275 RM TALL SINGLE BRICK FLUE RCC CHIMNEY, FUNDED BY TATA PROJECTS LIMITED, SANCTIONED AMOUNT RS. 1380000.
54. HIGH-ILP OPTIMIZED CORE AND SOC MICROARCHITECTURE, FUNDED BY INTEL TECHNOLOGY INDIA PVT.LTD. SANCTIONED AMOUNT RS. 3622500.
55. INVESTIGATION OF THE MICROSTRUCTURAL, THERMAL AND MECHANICAL PROPERTIES OF POLYPROPYLENE, POLYTHYLENE AND POLYURETHANE, FUNDED BY LOHIA CORP. LTD., SANCTIONED AMOUNT RS. 837000.
56. WIND TUNNEL TESTING OF LVM-3, FUNDED BY VSSC, SANCTIONED AMOUNT RS. 1926509.
57. POWER CONVERTOR DESIGN AND IMPLEMENTATION, FUNDED BY GE INDIA TEHNOLOGY CENTRE PVT. LTD., SANCTIONED AMOUNT RS. 650000.
58. WIND TUNNEL TESTING OF 275 M TALL RCC CHIMNEY FOR COAL BASED TUTICORIN TPP FOR 1X525 MW AT TUTICORIN, TAMILNADU, FUNDED BY MEGHNA ENGINEERING & INFRASTRUCTURES LTD., SANCTIONED AMOUNT RS. 1840000.
59. WIND TUNNEL MODEL STUDY ON CHIMNEY, FUNDED BY BGR ENERGY SYSTEMS LIMITED, SANCTIONED AMOUNT RS. 1380000.
60. WIND TUNNEL MODEL STUDY ON NDCT, FUNDED BY BGR ENERGY SYSTEMS LIMITED, SANCTIONED AMOUNT RS. 1725000.
61. SYSTEM IDENTIFICATION AND MATH MODEL DEVELOPMENT FOR NAVAL ROTARY UNMANNED AERIAL VEHICLE (NRUAV), FUNDED BY AERONAUTICAL DEVELOPMENT ESTABLISHMENT, SANCTIONED AMOUNT RS. 23862500.
62. VESTING OF DESIGNING DRAWING OF RAM NAGAR ENCLAVE 960 E.W.S (G,3) HOUSES, FUNDED BY KANPUR DEVELOPMENT AUTHORITY, SANCTIONED AMOUNT RS. 690000.
63. ASSESSMENT OF CONARC OPERATING PERFORMANCE, FUNDED BY JSW, SANCTIONED AMOUNT RS. 625313.
64. CONDITION ASSESSMENT OF STRUCTURAL MEMBERS OF PNB

OFFICE BUILDING, FUNDED BY PUNJAB NATIONAL BANK BIRHANA ROAD KANPUR, SANCTIONED AMOUNT RS. 927188.

65. STUDIES RELATING TO CONCRETE MIX PROPORTIONING AND PROPERTIES IN ONGOING PROJECTS, FUNDED BY M/S HINDUSTAN CONSTRUCTION COMPANY, SANCTIONED AMOUNT RS. 900000.
66. STUDIES RELATING TO CONCRETE MIX PROPORTIONING AND PROPERTIES IN ONGOING PROJECTS, FUNDED BY M/S HINDUSTAN CONSTRUCTION COMPANY, SANCTIONED AMOUNT RS. 900000.
67. WIND TUNNEL TESTING OF 60% THICK AIRFOIL, FUNDED BY M/S SUZION ENERGY LIMITED, SANCTIONED AMOUNT RS. 1080000.

#### **B. International Projects**

1. EXPERT OPINION ON PACKAGED WASTEWATER TREATMENT, FUNDED BY KOHLER CO., SANCTIONED AMOUNT RS. 201000.
2. FACE RECOGNITION, FUNDED BY FACEFIRST, INC., SANCTIONED AMOUNT RS. 158170.
3. SCOPING STUDY TO MANAGE THE SILT IN THE KOSI RIVER OF BIHAR, FUNDED BY OXFORD POLOCY MANAGEMENT LIMITED, SANCTIONED AMOUNT RS. 1072000.
4. INVESTING THE SCOPE OF KNOWLEDGE BASED SERVICES IN THE SOCIAL ENTERPRISE ECOSYSTEM, FUNDED BY CENTER FOR CURIOSITY, SANCTIONED AMOUNT RS. 1994420.
5. ICRW-BILL GATES, FUNDED BY INTERNATIONAL CENTER FOR RESEARCH ON WOMEN, SANCTIONED AMOUNT RS. 980000.