

**GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF SCIENCE & TECHNOLOGY
LOK SABHA
UNSTARRED QUESTION No. 2795
TO BE ANSWERED ON 03.08.2022
SCHEMES AND PROJECTS OF MINISTRY**

2795. SHRI B.Y. RAGHAVENDRA:

Will the Minister of SCIENCE AND TECHNOLOGY विज्ञान और प्रौद्योगिकी मंत्री be pleased to state:

- (a) the details of schemes and projects of the Ministry implemented or being implemented in the State of Karnataka;**
- (b) whether the Government has evaluated the performances of various schemes under its implementation, if so, the details thereof and the action being taken thereon; and**
- (c) the details of the total funds allocated for such schemes and programs?**

ANSWER

**MINISTER OF STATE (INDEPENDENT CHARGE) OF THE
MINISTRY OF SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)**

**विज्ञान और प्रौद्योगिकी तथा पृथ्वी विज्ञान मंत्रालय के राज्य मंत्री (स्वतंत्र प्रभार)
(डॉ. जितेंद्र सिंह)**

(a) & (b) Yes, Sir. The Ministry of Science and Technology (MoST), Government of India (GoI) is implementing several schemes and projects for the promotion of Science and Technology (S&T) in the country including the State of Karnataka. The schemes and supported projects of the Ministry are in alignment with different components of Sustainable Development Goals (SDGs) and National Development Programmes (NDPs) catering to different cross-sections of society and promoting Science, Technology and Innovation (STI) ecosystem through support towards

- i. Research & Development**
- ii. S&T Institutional and Human Capacity Building,**
- iii. Innovation, Technology Development and Deployment for socio-economic development.**

The promotion of S&T across the country is accomplished through three main wings of the Ministry namely the Department of Science and Technology (DST), the Department of Biotechnology (DBT) and the Department of Scientific and Industrial Research (DSIR)/ Council of Scientific and Industrial Research (CSIR). These Departments support projects to create S&T infrastructure and manpower, S&T-led

innovations and startups, technology development and seeding of the cutting-edge, futuristic areas of S&T to connect and empower the following stakeholders:

- (i) Universities: IITs; R&D institutions**
- (ii) Youth: Students; Scientists, Researchers**
- (iii) Women Scientists; Scientists of Weaker Segments**
- (iv) Innovators; Entrepreneurs; Startups**
- (v) Industry; Community based organizations**
- (vi) State Governments; Ministries**
- (vii) International connects**

DST plays a pivotal in the promotion of S&T in the country and is the key driving force for its stimulation. Some of the noteworthy schemes/programmes of DST are:

- Innovation in Science Pursuit for Inspired Research (INSPIRE)**
- State Science and Technology Programme (SSTP)**
- Science and Society Programme (SSP)**
- Tribal Sub Plan (TSP)**
- Scheduled Caste Sub Plan (SCSP)**
- Women Scientists Scheme**
- Technology Development Programme (TDP)**
- Fund for Improvement of S&T (FIST)**
- Promotion of University Research and Scientific Excellence (PURSE)**
- Sophisticated Analytical Instrumentation Facility (SAIF)**
- Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI)**
- International Cooperation (IC)**
- Technology Fusion & Applications Research (TFAR)**

The list of projects funded in State of Karnataka under above mentioned schemes/programs is enclosed as Annexure I. Apart from the above-mentioned schemes, DST through its Autonomous Body, Science and Engineering Research Board (SERB) has numerous initiatives to promote S&T across the country including the State of Karnataka.

The Department of Biotechnology (DBT) has been providing grants for the development & promotion of biotechnology in various States of the country including the State of Karnataka. List of R&D projects under various R&D programs funded in Karnataka is placed at Annexure II. The support is primarily for Basic and Translational Research & Development for Agriculture Crop Biotechnology, Basic Inter-Disciplinary Biology, Animal Biotechnology, Health, Food and Nutrition including Vaccines, Drugs, Regenerative Medicine, Bioengineering, Terrestrial, Marine and Environmental Biotechnology, Clean Energy, System and Synthetic Biology, Human Genetics and Genome Analysis. DBT also supports Biotechnology for societal development to generate new knowledge, leads and technologies to promote biotechnology at the community level.

CSIR through its dynamic network of 38 national laboratories, 39 outreach centres, 3 Innovation Complexes and 5 units are creating cutting-edge R&D knowledgebase in diverse S&T areas across the country. The R&D done in these institutions provides significant technological intervention in many areas with regard to societal efforts, which include environment, health, drinking water, food, housing, energy, farm and non-farm sectors that could indirectly lead to employment generation of youth.

CSIR has established two institutes in the State of Karnataka, CSIR-Central Food Technological Research Institute (CFTRI), Mysuru for R&D in the area of food science and technology and CSIR-Fourth Paradigm Institute (CSIR-4PI), to promote mathematical modelling and data-driven research.

The performance evaluation of the schemes under implementation by MoST, GoI is done through various mechanisms as given below:

- **Third Party Evaluation**
- **On-the-spot assessment of projects**
- **Periodic Review of Schemes by Experts**
- **Review of supported projects through Group Monitoring Workshops**
- **Formulation of Measurable indicators to evaluate outcomes**
- **Review of mandatory schemes by the Ministry of Tribal Affairs (for TSP Scheme) and by the Ministry of Social Justice and Empowerment (for SCSP Scheme), periodic review of TSP and SCSP by NITI Aayog.**

Mid-term course correction and action are taken as per the recommendations of the programme-specific Expert Committee by the respective Programme Division (PD) in the Department.

(c) The details of the funds allocated to the State of Karnataka by DST and DBT under various schemes and projects in last three years is given in table below:

Name of Scheme	Expenditure (in Crore)		
	FY 2019-20	FY 2020-21	FY 2021-22
Department of Science and Technology			
Innovation Technology Development and Deployment	46.95	36.89	43.48
Research & Development	69	37.44	25.26
S&T Institutional & Human Capacity Building	72.43	76.10	73.20
National Mission on Interdisciplinary Cyber-Physical Systems	Nil	22.49	Nil
Total	188.38	172.92	141.94
Department of Biotechnology			
R&D Program	126.37	112.05	75.75
Grand Total	314.75	284.97	217.69

ANNEXURE-I

S. No.	Name of the sub-scheme/Programme	Year of Sanction of the project	Project Title	PI Name & Address
1.	Science and Society Programme (SSP)	2020-21	Block chain enabled smart organ Donation and Transplant System in India	Dr. Sunil Kumar s Manvi School of Computing and Information Technology Department, REVA University, Kattegenhalli Yelahanka, Bangalore - 560064
2.	Science and Society Programme (SSP)	2019-20	Value addition of plantain waste biomass to fabric grade banana fiber: an experimental study on processing weaving, and designing contemporary fashions in Coastal Karnataka	Dr. Veena Rao Department of Design, Faculty of Architecture, Manipal Academy of Higher Education, Manipal, Udupi (0820)2924118
3.	Science and Society Programme (SSP)	2020-21	“Development of a foldable smart live fish transportation system for distant trade of table fish	Dr. Aseefhali Bankapur, Department of Atomic & Molecular Physics, Manipal Academy of Higher Education, Madhav Nagar, Near Tiger Circle, Manipal, Udupi-576104, Karnataka
4.	Science and Society Programme (SSP)	2020-21	Synthesis of high strength and corrosion resistant nano-structured stainless steels by selective laser melting	Dr. Shamanth V School of Mechanical Engineering, REVA University, Rukmini Knowledge Park, Kattigenahalli, Bangalore, Karnataka 080-66226622 +91 9972521114
5.	Science and Society Programme (SSP)	2019-20	Designing and Fabrication of micro fluidic PFMS-paper chip for early detection of neonatal sepsis	Dr. Rajesh P.C. Yenepoya Research Centre, YENEPOYA University, Mangalore - 575018 9902200698
6.	Science and Society Programme (SSP)	2019-20	Ultrafome Grain refinement through low plasticity burnishing on WAAM Mgalloy for Aerospace and Automotive application	Dr. A S S BALAN Department of Mechanical Engineering, National Institute of Technology (NIT) Karnataka, NH 66, Srinivas Nagar, Surathakal - 575025, Karnataka 9789941487
7.	Science and Society Programme (SSP)	2020-21	Mobile eye tracking technology for early detection of glaucoma	Dr. Shonraj BG, Manipa Academy of Higher Education, Madhava Nagar,

				Manipal - 576104, Udupi District, Karnataka
8.	Science and Society Programme (SSP)	2019-20	Design and testing of robust, high efficient, low polluting LPG porous burners for household applications	Dr. Parthasarathy P National Institute of Technology Karnataka, Surathkal -Mangalore, Karnataka
9.	Science and Society Programme (SSP)	2020-21	Development and evaluation of nanoadsorbent filter system for dairy plant effluent treatment	Dr. Dinesh Centre for Nanotechnology, Dept. Of Processing and Food Engineering, Cllege of Agricultural Engineering, University of Agricultural Science, Raichur - 584104
10.	Science and Society Programme (SSP)	2019-20	Evaluation of Heterotrophic Food Chain in Different Agro Climatic Regions and Strategies for Enhancement of Fish Production	Dr. Manjappa N, Assistant Professor, Department of Fisheries Research and Information Centre (Inland), Fisheries Research and Information Centre Karnataka Veterinary, Animal and Fisheries Sciences University, Fisheries Research and Information Centre, Hesaraghatta, Bengaluru - 560089
11.	State Science and Technology Programme (SSTP)	2019-20	Project proposal on Student Project Scheme	Dr. S. G. Sreekanteswara Swamy, Member Secretary, Karnataka State Council of Science & Technology (KSCST), Indian Institute of Science Campus, Bengaluru - 560012
12.	State Science and Technology Programme (SSTP)	2019-20	Disease burden quantification in small ruminants and impact of adopting preventive interventions on rural livestock farmers in Odisha	Dr. G. Govindaraj, Senior Scientist, Department of Agricultural Economics, ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Post Box No. 6450, Ramagondanahall village, Yelahanka, Bangalore-560 064, Karnataka
13.	State Science and Technology Programme (SSTP)	2019-20	Assistance for S&T Secretariat to Karnataka State Council for Science and Technology (KSCST)	Shri. H. Hemanth Kumar Executive Secretary

14.	State Science and Technology Programme (SSTP)	2020-21	Assistance for S&T Secretariat to Karnataka State Council for Science and Technology (KSCST)	Shri. H. Hemanth Kumar Executive Secretary
15.	State Science and Technology Programme (SSTP)	2021-22	Assistance for S&T Secretariat to Karnataka State Council for Science and Technology (KSCST)	Shri. H. Hemanth Kumar Executive Secretary
16.	Scheduled Cast Sub Plan (SCSP)	2020-21	Establishment of Scheduled Caste (SC)/Scheduled Tribe (ST) Cell in State Science and Technology Council of Karnataka State.	Mr. Hemanth Kumar Karnataka State Council for Science and Technology, India Institute of Science Campus, Bengaluru-560 012, Karnataka.
17.	Scheduled Cast Sub Plan (SCSP)	2020-21	Establishing SHG/FPO enterprises to address malnutrition and provide rural livelihoods in Yadgir District, Karnataka.	Mr. H. Hemanth Kumar Karnatak State Council for Science and Technology (KSCST), Iisc-Campus, Bengaluru-560012.
18.	Scheduled Cast Sub Plan (SCSP)	2020-21	Processing and Value Addition of Under Exploited Flowers and Tubers for Entrepreneurship Development and Economic Empowerment of SC/ST Beneficiaries	Dr. Veena S Jadhav Department of Family Resource Management, College of Community Science, University of Agricultural Science Dharwad-580 005.
19.	Scheduled Cast Sub Plan (SCSP)	2020-21	Innovative ICT Enabled Co-Working Community Center Design for Rural Development.	Dr. Mahesh P K ATME College of Engineering, Bannur Road, Mysore – 570028, Karnataka.
20.	Scheduled Cast Sub Plan (SCSP)	2021-22	Science Technology and Innovation Hub in Challakere Campus of Indian Institute of Science, Chitradurga, Karnataka.	Prof. Balan Gurumoorthy Society for Innovation and Development, Indian Institute of Science, CV Raman Rd, Devasandra Layout, Bengaluru, Karnataka-560012.
21.	Scheduled Cast Sub Plan (SCSP)	2021-22	Emerging innovative avenues of agroforestry based entrepreneurship development for SC Communities of Uttara Kannada district of Karnataka.	Mr. Venkatesh L, ICAR-KrishiVigyan Kendra (UAS, Dharwad), Banavasi Road, Sirsi-581401, Uttara Kannada district, Karnataka.

22.	Technology Fusion & Applications Research (TFAR) Programme	----	Deep learning for improving Photoacoustic Imaging	Indian Institute of Science (IISc), Bangalore
23.	Technology Fusion & Applications Research (TFAR) Programme	----	Cancer Classification using Gene Expression Data	REVA University- Bangalore
24.	Technology Fusion & Applications Research (TFAR) Programme	----	Multi Graph based Anomaly Detection Model for Social Network Analysis using Machine Learning	National Institute of Technology(NIT),
25.	Technology Fusion & Applications Research (TFAR) Programme	----	Preservation and analysis of the century-long solar data from Kodaikanal Solar Observatory	Indian Institute of Astrophysics (IIA)- Bangalore
26.	Technology Fusion & Applications Research (TFAR) Programme	----	Natural non-native English speech synthesis	Indian Institute of Science (IISc), Bangalore
27.	Technology Fusion & Applications Research (TFAR) Programme	----	Data Management and Machine Learning models to create a robust farm advisory system to improve farm performance and welfare of farmers	Indian Institute Of Management(IIM), Bangalore
28.	Technology Fusion & Applications Research (TFAR) Programme	----	Distributed Multi-Agent Algorithms for Dynamic Control of Microgrids	Indian Institute of Science (IISc), Bangalore
29.	Technology Fusion & Applications Research (TFAR) Programme	----	Edge+Cloud Hybrid Orchestration framework for Internet of Things Applications (ECHO4IoT)	Indian Institute of Science (IISc), Bangalore
30.	Technology Fusion & Applications Research (TFAR) Programme	----	Verification and Validation of IoT systems	International Institute of Information Technology(IIIT)-Bangalore
31.	Technology Fusion & Applications Research (TFAR) Programme	----	Feasibility Evaluation, Impact Quantification and Mitigation of Low-Rate Cyber Attacks on Multipath Transmission Control Protocol (MPTCP)	Council of Scientific and Industrial Research (CSIR)-4PI, Bangalore
32.	Technology Fusion & Applications Research (TFAR) Programme	----	Mobile payment Systems for the Internet of Things Era	Indian Institute of Science (IISc), Bangalore
33.	Technology Fusion & Applications Research (TFAR) Programme	----	3D Reconstruction and Visualization of Underwater Archaeological Site Poompuhar	KLE Technological University, Hubballi

34.	Technology Fusion & Applications Research (TFAR) Programme	----	Historical water systems in the extended landscape of Malaprabha River Valley	National Institute of Advanced Studies(NIAS), IISc campus-Bangalore
35.	Technology Fusion & Applications Research (TFAR) Programme	----	Early fusion music: Cross-cultural musical exchanges in colonial India from the late 18th to the early 20th century	National Institute of Advanced Studies(NIAS), IISc campus-Bangalore
36.	Technology Fusion & Applications Research (TFAR) Programme	----	Crowd sourcing Framework for Digital Archiving and Presentation of Cultural Heritage(Data Repository Management Project)	KLE Technological University
37.	Technology Fusion & Applications Research (TFAR) Programme	----	Epidemiology Data Analysis and Visualization (EPIDAVIZ) Project	St Johns Research Institute, Karnataka
38.	Technology Fusion & Applications Research (TFAR) Programme	----	Sources for Quantum Information Processing	Indian Institute of Science (IISc), Bangalore
39.	Technology Fusion & Applications Research (TFAR) Programme	----	Long Distance Quantum Communication Repeater and Relay technologies	Raman Research Institute, Karnataka
40.	Technology Fusion & Applications Research (TFAR) Programme	----	Robust control of swarm robots: Learning from Nature	Indian Institute of Science (IISc), Bangalore
41.	Technology Fusion & Applications Research (TFAR) Programme	----	CP-ABE Scheme with Decryption Keys of Constant Size using ECC with Expressive Threshold Access	National Institute of Technology(NIT),
42.	Technology Fusion & Applications Research (TFAR) Programme	----	Conducted Technology awareness Workshop on Artificial Intellegence	University of Mysore, Karnataka
43.	Technology Fusion & Applications Research (TFAR) Programme	----	Conducted Technology awareness Workshop on Artificial Intellegence	Mangalore University, Karnataka
44.	Technology Fusion & Applications Research (TFAR) Programme	----	Conducted Technology awareness Workshop on Sensor Network	Acharya Institute of Technology, Bangalore, Karnataka
45.	Technology Fusion & Applications Research (TFAR) Programme	----	Dephasing of quantum states in many-body localized and other types of disordered using systems	Indian Institute of Science (IISc), Bangalore
46.	Technology Fusion & Applications	----	Role of uncertainty relations and measurement incompatibility in	Bangalore University, Bangalore

	Research (TFAR) Programme		quantum information processing tasks	
47.	Technology Fusion & Applications Research (TFAR) Programme	----	Demonstration of a 4-qubit quantum processor using superconducting qubits in scalable architecture	Indian Institute of Science (IISc), Bangalore
48.	Technology Fusion & Applications Research (TFAR) Programme	----	In Anticipation of Quantum Computers	Indian Institute of Science (IISc), Bangalore
49.	Technology Fusion & Applications Research (TFAR) Programme	----	Mitigating and Managing Urban Heat Islands Through Social Forestry Using Hyper & Multi-spectral remote sensing	Central University of Karnataka, Gulberg.
50.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2019-20	FIST Project	Department of Bioinformatics and Applied Biotechnology, Institute of Bioinformatics and Applied Biotechnology (IBAB), Biotech Park, Electronics City, Phase I, Bengaluru- 560100, Karnataka
51.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2019-20	FIST Project	Centre for Neurosciences, Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
52.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2019-20	FIST Project	Department of Physics, University of Mysore, Mysore, Karnataka
53.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2019-20	FIST Project	Department of Pharmacy Practice, Manipal Academy of Higher Education, Madhav Nagar, Near Tiger Circle, Manipal, Udupi - 576104, Karnataka
54.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2019-20	FIST Project	Department of Neurology, National Institute of Mental Health and Neuro Sciences (NIMHANS), Hosur Road, Bengaluru-560029, Karnataka

55.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2020-21	FIST Project	Centre for Atmospheric and Oceanic Sciences, Indian Institute of Science, C. V. Raman Road , Bengaluru-560 012 ,Karnataka
56.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2020-21	FIST Project	Department of Paediatrics and Biochemistry, Kasturba Medical College, Madhav Nagar, Manipal-576104 Karnataka
57.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2020-21	FIST Project	Department of Neuro-imaging & Interventional Radio, National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru - 560029 Karnataka
58.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2021-22	FIST Project	Department of Electrical Communication Engineering, Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
59.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2021-22	FIST Project	Department of Electronic Systems Engineering, Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
60.	Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST)	2021-22	FIST Project	Department of Mathematics, Indian Institute of Science, CV Raman Road, Bengaluru-560012, Karnataka
61.	Promotion of University Research and Scientific Excellence (PURSE)	2020-21	PURSE Project	Bangalore University, Mysore Rd, Jnana Bharathi, Bengaluru-560056, Karnataka
62.	Promotion of University Research and Scientific Excellence (PURSE)	2021-22	PURSE Project	Mangalore University, Mangalagangothri, Mangaluru-574199, Karnataka
63.	Promotion of University Research and Scientific Excellence (PURSE)	2021-22	PURSE Project	JSS Academy of Higher Education and Research, Sri Shivarathreshwara Nagara, Bannimantap, Mysuru-570004, Karnataka

64.	Sophisticated Analytical Instrumentation Facility (SAIF)	2019-20	SAIF Centre	Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
65.	Sophisticated Analytical Instrumentation Facility (SAIF)	2020-21	SAIF Centre	Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
66.	Sophisticated Analytical Instrumentation Facility (SAIF)	2021-22	SAIF Centre	Indian Institute of Science, C. V. Raman Road, Bengaluru-560012, Karnataka
67.	Sophisticated Analytical Instrumentation Facility (SAIF)	2020-21	SAIF Centre	Karnatak University, Pavate Nagar, Dharwad-580003, Karnataka
68.	Sophisticated Analytical Instrumentation Facility (SAIF)	2021-22	SAIF Centre	Karnatak University, Pavate Nagar, Dharwad-580003, Karnataka
69.	Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI)	2021-22	STUTI PMU	JSS Academy of Higher Education and Research, Sri Shivarathreshwara Nagara, Bannimantap, Mysuru-570004, Karnataka
70.	International Cooperation	2020-2021	Experimental and numerical engineering of eutectic microstructures in novel high melting Mo-Si-Ti alloys processed by additive manufacturing: microstructure, texture and ensuing mechanical properties	Prof. Satyam Suwas Indian Institute of Science Bangalore Karnataka
71.	International Cooperation	2020-2021	Metal-Oxide nanoparticle assemblies for gas sensors	Dr. Navakanta Bhat Indian Institute of Science Bangalore Karnataka
72.	International Cooperation	2020-2021	Robust topological methods for analysis of dynamic large-scale data for modern material design	Prof. Vijay Natarajan Computer Science and Automation, Indian Institute of Science Bangalore Karnataka
73.	International Cooperation	2020-2021	Manipulation of static and dynamic properties of oxide heterostructures	Prof. Srimanta Middey Indian Institute of Science

				Bangalore Karnataka
74.	International Cooperation	2020-2021	Design and Development of Ultra-Low Power CMOS IC for Wireless Neural Monitoring System	Dr. Sandeep Kumar National Institute of Technology Mangalore Karnataka
75.	International Cooperation	2020-2021	New Barrier Encapsulation for Flexible Energy Storage and PV Devices	Prof. Praveen C Ramamurthy E 311, Department of Materials Engineering, IISc, Bangalore Karnataka 560012
76.	International Cooperation	2020-2021	Development of the scientific basis for the creation of effective high molecular weight surfactants that improve the technological properties of disperse systems	Dr. Latha M S Sri Venkateshwara College of Engineering Bangalore Karnataka
77.	International Cooperation	2020-2021	Novel N4 Macrocycles as efficient catalysts for the clean energy production	Dr. K. S. Lokesh Vijayanagara Sri Krisnadevaraya University Ballari Karnataka
78.	International Cooperation	2020-2021	Nanoscale manufacturing platform to combat pandemics like COVID-19	Dr. Kaushik Chatterjee Department of Materials Engineering Indian Institute of Science C.V. Raman Avenue Bangalore-560012 Karnataka
79.	International Cooperation	2020-2021	Design and development of nanomaterials-based sensor devices for health monitoring of artificial heart valve	Prof. Prosenjit Sen Indian Institute of Science Bangalore Karnataka
80.	International Cooperation	2020-2021	Structure, functions and activation of bacterial type III toxin-antitoxin complexes	Dr. Mahavir Singh Indian Institute of Science Bangalore Karnataka
81.	International Cooperation	2020-2021	A simple method of control microdrop generation of various liquids for bio-printing and heat management	Prof. Prosenjit Sen Indian Institute of Science Bangalore Karnataka

82.	International Cooperation	2020-2021	Network Polymer Electrolytes for alloy-based electrodes for Na-ion batteries	Prof. Aninda Jiban Bhattacharyya Indian Institute of Science Bangalore Karnataka
83.	International Cooperation	2021-2022	Design and development of nanomaterials based flexible smart proximity sensor for COVID related human detection application	Prof. K. Rajanna Indian Institute Of Science Bangalore, Karnataka
84.	International Cooperation	2021-2022	Improving tolerance traits in crops through the epigenetic control of stress-responsive genes	Dr. P.V Shivprasad Tata Institute of Fundamental Research, Bengaluru Karnataka
85.	International Cooperation	2021-2022	Deposition of Metal Oxides on Halide Perovskites for PV Cells	Prof. Depankar D Sarma IISc Bangalore Karnataka
86.	International Cooperation	2021-2022	Lubricant guidance as a novel tool in Green Tribology	Prof. M.S. Bobji Indian Institute of Science Bangalore Karnataka
87.	International Cooperation	2021-2022	Development of a genome engineered stem cell drug toxicity model for developing countries	Prof. K. Satyamoorthy School of Life Sciences, Manipal University Manipal Karnataka
88.	S&T for Women	2020-21	Development of AI machine for sex identification of pupa and cocoon cutting to foster women empowerment in sericulture	Dr. Jyothi Thomas, Associate Professor Christ University, Kengeri-Campus, Mysore Road, Bengaluru, Karnataka
89.	Waste Management Technologies (WMT) Program	2021-22	Development of filaments for 3D printing and other applications, from Recycled PET bottles and other plastic waste	Dr. B Krishna prabhu Professor and Head CANARA ENGINEERING COLLEGE Benjanapadavu, Mangalore Karnataka
90.	Waste Management Technologies (WMT) Program	2021-22	Development of Plastic bonded Bamboo mat board and Plastic bonded plywood (PBP & PBB) from Waste Recyclable Plastic material for Construction and Packing units.	Dr.Vipin Kumar Chawla, Scientist-E, INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE BANGALORE.

91.	Waste Management Technologies (WMT) Program	2021-22	Sustainable, Biodegradable and Affordable Substitutes for 'Single use Plastic' using Castor Oil and Stubble Aggregate	Prof. Kaushik Chatterjee, Department of Materials Engineering, Indian Institute of Science Bangalore, Karnataka (consortia project)
92.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Multi material deposition technology development for complex geometries of aircraft engine components by additive manufacturing	A.R. Vinod, Scientist-D, Centre for Additive & Special Manufacturing Processes, Central Manufacturing Technology Institute, Bengaluru.
93.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Simulation of the spring-in in composite spars during manufacturing process	S Nadeem Masood Sr. Scientist, Advanced Composites Division, National Aerospace Laboratories, Bangalore.
94.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Development of Digital Fringe Projection Scanner	Ms. Deepa Radhakrishnan Central Manufacturing Technology Institute Bengaluru
95.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Design and Development of Smart Robotic based magnetically impelled arc butt welding equipment for joining ferrous and non-ferrous tubes	Dr. S. Arungalai Vendan Associate Professor. Department of Electronics and Communication Engineering, School of Engineering, Dayananda Sagar University, Bangalore
96.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Development of hand-held laser scanner	Dr. Deepa Radhakrishna Scientist-C Central Manufacturing Technology Institute, Tumkur Road, Bengaluru, Karnataka
97.	Advanced Manufacturing Technologies (AMT) Program	2019-20	Near Net Shape Processing of Ceramic Parts Through Layered Manufacturing	Dr. U. Chandrasekhar Pro-Vice Chancellor & Professor Krishnagiri Highways, NH-7, Koneripalli HOSUR
98.	Advanced Manufacturing Technologies (AMT) Program	2021-22	Scalable coating of metal oxides on hybrid transparent electrodes and fabrication of smart window devices	Prof. Giridhar U Kulkarni Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore & Dr. Ashutosh Kumar Singh Centre for Nano and Soft Matter Sciences (CeNS), Bangalore

99.	Technology Enabling Centers in University system	2019-20	Financial assistance for Establishing Technology Enabling Centre (TEC) in NITTE University Centre for Science and Research, Mangaluru.	Dr. Smitha Hegde, Professor, NUCSER, NITTE University, Mangaluru – 575018 karnataka
100	AGRO	2019-20	Design and development of standalone Aeroponic Chamber with High Light Quality Factor and Climatic Control	Prof. Sreenivas K R Deptt. Of Eng. Mechanics Unit Jawaharlal Nehru, Centre for Advanced, Scientific Research, Karnataka
101	Device Development Programme (DDP)	2021-22	Design and Fabrication of Low-Cost Analytical Devices for Rapid Detection of Hazardous Ions in Potable Water	Prof. Mahaveer Kurkuri, Professor, Centre for Nano and Material Sciences, Jain University, Bangalore, Karnataka
102	Device Development Programme (DDP)	2021-22	Road Condition Monitoring and Information System	Dr. Mallikarjun M K, Assistant Director and Professor, Computing Information Technology, REVA UNIVERSITY, kattegehalli, Yelahanka, Bengaluru Rural-560064, Karnataka
103	Device Development Programme (DDP)	2020-21	MXene-Graphene Nanocomposite sensor embedded warm clothing/Apparel for soldiers: Design, development, fabrication and proto fabrication.	Prof. Prosenjit Sen Centre for Nano Science and Engineering Indian Institute of Science, Bangalore
104	Device Development Programme (DDP)	2020-21	Development of a highly sensitive, cost effective, rapid optical fiber biosensing platform for multi bio-analyte detection and proof of concept for simultaneous detection of cardiovascular markers	Prof. S. Asokan Instrumentation and Applied Physics Indian Institute of Science, bangalore-560012
105	Science and Heritage Research Initiative (SHRI)	2021-22	Archaeometallurgical, ethnometallurgical and ethnoarchaeological investigations on metal artefacts and related tangible heritage from early Tamil sites	Prof. Sharada Srinivasan National Institute of Advanced Studies, Indian Institute of Science Campus, Bengaluru, Karnataka (560012)
106	Science and Heritage Research Initiative (SHRI)	2021-22	An artificial intelligence-based system for the preservation, restoration and translation of the prominent Sharda literature of Jammu and Kashmir.	Ms. Nimrita Koul Assistant Professor Computer Science and Engineering REVA University, Bangalore Karnataka – 560064

107	Technology Development Programme (TDP)	2019-20	Development of inexpensive Surface Plasmon Resonance (SPR) based biosensor for the detection of cardiovascular diseases.	Dr. Rajeev Kumar Sinha, Associate Professor
108	Technology Development Programme (TDP)	2019-20	Immunological Capturing of Circulating Tumor Cells (CTCs) by Novel lab-on-Chip Microfluidic Devices.	Prof. Mahaveer Kurkuri
109	Technology Development Programme (TDP)	2019-20	Development of Electro Thrombogram (Etg) A Point of Care Electronics Device to Assess the Blood Coagulation Status.	Dr. Srinivasa Murthy D, Professor in Pediatrics
110	Technology Development Programme (TDP)	2019-20	Design and Development of Virtual Comprehensive Neonatal Monitoring System (VICONEMS).	Dr. N. Sriraam
111	Technology Development Programme (TDP)	2019-20	Prototype for Electronic Mass Screening Device for Point-of-Care Diagnostic of Sickle Cell Diseases.	Dr. Gautam Vivek Soni, Associate Professor
112	Technology Development Programme (TDP)	2019-20	Liquid Biopsy for Oral Cancer Screening using Superhydrophobic Surface Enhanced Raman Plasmonic Droplet Assay.	Prof. Sajan Daniel George, Professor
113	Technology Development Programme (TDP)	2019-20	Development of a Microfluidics Based Point-of-Care Device for Intra-Operative Detection of Metastatic Lymph Nodes in Oral Cancer.	Dr. Hardik Pandya, Assistant Professor
114	Technology Development Programme (TDP)	2020-21	Phone-A device for diagnosis and monitoring of obstructive lung diseases using simultaneous vocal and lung breath sounds.	Prof. Prasanta kumar Ghosh Associate professor
115	Technology Development Programme (TDP)	2020-21	Design and development of nanoscale integrated system along with conformal antenna as capsule prototype for wireless capsule endoscopy	Dr. Sandeep Kumar, Assistant Professor,
116	Technology Development Programme (TDP)	2020-21	Design and development of wearable electrolynx with minimal human intervention and speech enhancer .	Dr. Madhushankaran M Associate professor
117	Technology Development Programme (TDP)	2020-21	Development of Immunofluorescent	Dr, Praveen Rai , Associate professor

			Nanodiagnostic Assay as a point of care detection of Dengue virus.	
118	Technology Development Programme (TDP)	2020-21	Development of a miniaturized affordable single detector based multiple fluorescence analyser for clinical diagnostic, Including Monitoring	Dr. Taslimarif Saiyed, PI, DIA Group, CEO & Director/
119	Technology Development Programme (TDP)	2020-21	Smart tVNS: A device that uses closed loop technology and machine learning to optimise non invasive transcutaneous vagal nerve stimulation (tVNS) for refractory epilepsy monitoring and Treatment .	Dr. Ravindranadh Chowdary Mundlamuri , Associate professor .
120	Technology Development Programme (TDP)	2020-21	Technology development for a novel combination of neuro feedback and closed -loop auditory neuromodulation (closed loop Assisted Brain Training)and its pilot scale testing as an add-on therapy patients with Chronic pain	Dr. Arun Sasidharan, Scientist -C
121	Technology Development Programme (TDP)	2020-21	To Develop diagnostic tool for the most common urogenital infection in women	Prof.UTPAL Tatu
122	Technology Development Programme (TDP)	2020-21	Bimodal Intra -operative probe for Brain Tumor Delineation ,	Dr. Anita Mahadevan , Professor ,
123	Technology Development Programme (TDP)	2020-21	Development of a device for the detection of the Mycobacterium tuberculosis, causal agent of Extra pulmonary Tuberculosis.	Dr. Sumana K ,
124	Technology Development Programme (TDP)	2020-21	Design and Development of a Smart Miniature cost effective Infusion Pump for medical use	Dr. NS Dinesh, Associate Professor
125	Technology Development Programme (TDP)	2020-21	Neonatal Hearing Screening Headband for Brainstem and Cortical response extraction	Dr. Manjunath D, Associate Professor
126	Technology Development Programme (TDP)	2020-21	Edible electronic pill for the Diagnosis of the Gastrointestinal Tract.	Prof. Sanjiv Sambandan, Assistant Professor
127	Technology Development Programme (TDP)	2020-21	Design and Development of a cost- effective haptic device for medical education training and rehearsal	Dr. Ravindra S. Hegadi, Associate Prof

ANNEXURE-II

Grant amount approved and released in respect of R&D projects under various R&D programs in the state of Karnataka during FY2019-20	
R&D Program	Released Amount (Rs.)
Agriculture Biotechnology	9089767
Aquaculture And Marine Biotechnology	2328615
Accelerated Translational Grant for Commercialization (ATGC) for Medical Biotechnology	5116051
Basic Research in Modern Biology	343832668
BioCARE	19963868
Biomedical Engineering (Medical Devices, Diagnostics and Implants)	24456355
Bioresource and Natural Sciences	25223117
Biotech Based Programmes for Women	1581679
Cancer Research Biology	12185338
Chronic/Metabolic Diseases	19482201
Energy Biosciences - Biofuels	2908069
Forest Biotechnology	1650400
Genome Engineering & Nanobiotechnology Application In Healthcare	21108958
Genome India and Microbiome	67891320
Human Resource Development	139921619
Infectious Disease Biology- 1 (Bacterial & Fungal)	26991226
Infectious Disease Biology- 2 (Viral & Protozoal)	8789976
Infrastructure Facilities (BUILDER and SAHAJ)	7156000
International Cooperation	62090377
Livestock and Animal Biotechnology	6471582
Medical Biotechnology - Stem Cell Biology	271855250
Medical Biotechnology - Women and Child Health Research- Human Developmental and Disease Biology	9289066
Medical Biotechnology- Human Genetics & Genome Analysis	13421232
Medical Biotechnology- Neuroscience	16636116
NER Programme	22241329
Plant Biotechnology in New and Emerging Areas	1219200
Public Health Food And Nutrition	51183302
Ramalingaswami Re-entry Fellowship Programme	48165350
Star College Scheme	20426285
Theoretical and Computational Biology	1031013
Total	1263707329

Grant amount approved and released in respect of R&D projects under various R&D programs in the state of Karnataka during FY 2020-21	
R&D Program	Released Amount (Rs.)
Agriculture Biotechnology	10376107
Aquaculture and Marine Biotechnology	3690435
Artificial Intelligence	1551120
Basic Research in Modern Biology	82546782
BioCARE	7498183
Biomedical Engineering (Medical Devices, Diagnostics and Implants)	24814119
Bioresource and Natural Sciences	33337093
Biosystems & Bioprocess Engineering	575819
Biotech Based Programmes for Societal Development	417827
Biotechnology Information System Network (BTISNet)	6664969
Cancer Research Biology	20401136
Chronic/Metabolic Diseases	11570044
COVID-19 : Diagnostics	7917120
COVID-19 : Vaccines	2297504
Forest Biotechnology	4167485
Genome Engineering & Nanobiotechnology Application in Healthcare	6280799
Genome India and Microbiome	193800000
Human Resource Development	289996550
Infectious Disease Biology- 1 (Bacterial & Fungal)	30504473
Infectious Disease Biology- 2 (Viral & Protozoal)	16053925
Infrastructure Facilities	24100343
International Cooperation	49585651
Livestock and Animal Biotechnology	31102990
Medical Biotechnology - Stem Cell Biology	156689229
Medical Biotechnology - Women and Child Health Research- Human Developmental and Disease Biology	7413867
Medical Biotechnology- Human Genetics & Genome Analysis	15389407
Medical Biotechnology- Neuroscience	14625696
NER Programme	37493152
Plant Biotechnology in New and Emerging Areas	3203038
Public Health Food and Nutrition	10076733
Ramalingaswami Re-entry Fellowship Programme	13326358
Star College Scheme	496926
Theoretical and Computational Biology	2572699
Total	1120537579

Grant amount approved and released in respect of R&D projects under various R&D programs in the state of Karnataka during FY 2021-22	
R&D Program	Released Amount (Rs.)
Agriculture Biotechnology	15146781
Aquaculture And Marine Biotechnology	2409280
Artificial Intelligence	2553408
Accelerated Translational Grant for Commercialization (ATGC) for Medical Biotechnology	3077311
Basic Research in Modern Biology	113931902
BioCARE	4172820
Biomedical Engineering (Medical Devices, Diagnostics and Implants)	1685280
Bioresource and Natural Sciences	35622695
Cancer Research Biology	21051259
Chronic/Metabolic Diseases	9487316
COVID-19 : Diagnostics	11721617
COVID-19 : Vaccines	2126285
Drug Development	10568535
Energy Biosciences - Biofuels	8408240
Environmental Biotechnology	1890424
Forest Biotechnology	4150015
Genome Engineering & Nanobiotechnology Application in Healthcare	15193368
GENOME India and Microbiome	1160000
Human Resource Development	95545504
Infectious Disease Biology- 1 (Bacterial & Fungal)	58282224
Infectious Disease Biology- 2 (Viral & Protozoal)	6576100
Infrastructure Facilities	98319496
International Cooperation	76871509
Livestock and Animal Biotechnology	1908880
Medical Biotechnology - Women and Child Health Research- Human Developmental and Disease Biology	32589040
Medical Biotechnology- Human Genetics & Genome Analysis	56842366
Medical Biotechnology- Neuroscience	5140257
NER Programme	8173026
Plant Biotechnology in New and Emerging Areas	4919920
Public Health Food And Nutrition	34652809
Star College Scheme	11172456
Theoretical and Computational Biology	2156765
Total	757506888
