

Biochemical Engineering and Biotechnology
IIT Delhi
<http://beb.iitd.ac.in/>

Year End Review 2022 - Highlights



**Department of Biochemical Engineering and Biotechnology
Annual Report CY 2022**

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1. Faculty Awards and Recognition

Prof. Sunil Nath

- Elected **Fellow of the Danish Academy of Natural Sciences (DNA)** in December 2021. Invited to the Niels Bohr Institute (NBI), Copenhagen during May -- June 2022. He delivered his Invited Lecture, "Optimization of Free Energy Transduction in Oxidative Phosphorylation" at the NBI which also served as his Induction Lecture for Fellowship of the Academy.

Prof. Ritu Kulshreshtha

- Received **Prof. P.C. P. Bhatt Faculty Research Award** in Basic Research, Indian Institute of Technology Delhi- Jan, 2022
- Appointed in the **Editorial Board of Neuro-Oncology and Neurosurgical Oncology** (Specialty section of Frontiers in Neurology (IF-4.08) and Frontiers in Oncology- (IF-5.73)- June, 2022
- Appointed in the **Editorial Board of Cancer Cell International** (Springer Nature)- 2022 (IF-6.43)
- Appointed as co-opted **Program Advisory Committee** member (Biomedical Health Sciences), Science and Engineering Research Board- August, 2022
- Appointed as **Member of the Expert committee** of ``Grant-in-Aid (GIA) Scheme, Department of Health Research- September, 2022
- Part of Inaugural faculty **panel review committee** for **QUAD** Fellowships by Schmidt Futures
- Key speaker for the thematic session on **“Biology and Health Care”** under **UKIERI SPARC** Webinars held from 7-14 March 2022.
- Delivered lecture at **India |EMBO Lecture Course** entitled 'Functional Nucleic Acids: Recent landscapes and therapeutic applications' at RCB, Delhi, 16 -19th August 2022
- Panelist in 'Voice Matters: Women, Science, and Academia' to celebrate the **International Day of Women and Girls in Science**, February 11, 2022

Prof. Shilpi Sharma

- Featured in **“She is: Women in STEAM”**, joint honour conferred upon 75 women in STEAM by Government of India and British High Commission to commemorate 75 years of Independence (2022)
- Women Scientist medal (2021) by The Indian Botanical Society
- Women Scientist award (2021) by BRSI
- Member **PAC Life Sciences and Medical Biology**, International Cooperation Division, DST (2021-2024).

Prof. Ishaan Gupta.

- Key resource person for 5-day Faculty Development program-53 titled "Metagenomics - a Truly multidisciplinary science?" August 16-20 2021, delivered lecture on "Data analysis techniques for metagenomics"
- Contributing member, Human cell Atlas initiative.

Prof. Lucinda E. Doyle

- Featured as Cell Press Early Career Researcher in Focus (by Trends in Microbiology) Nov 2021
- Invited to be Scientific Committee member for ISMET8 conference (International Society for Microbial Electrochemistry and Technology)

Prof. D. Sundar

- Appointed as a Member of the Task Force on ‘Theoretical and Computational Biology (Bioinformatics, AI and Big Data) of the Department of Biotechnology (DBT), Govt of India (2022-2025).
- Appointed as a Member of the Task Force to review the progress of ‘Indian Biological Data Centre (IBDC)’ being established by the Department of Biotechnology (DBT), Govt. of India. The IBDC is an effort by Govt. of India for the purpose of deposition, storage, annotation and sharing of biological data. IBDC is mandated to archive all publically funded Life Science data generated at national level, 2021.
- Appointed as a Member of the CII National Task Force on Science and Data (Genomics), 2021.
- Research in the lab of Prof. Sundar was featured under ‘Top five AI research projects from Indian Academia from 2021’ (<https://indiaai.gov.in/article/top-five-ai-research-projects-from-indian-academia-from-2021>).

2. Student Awards and Recognition

- Our **iGEM2022 team** was selected to receive the **2022 Impact Grant**. They received US\$ 2500 to take their iGEM2022 research to the next level.
- **Team "LEADer" won iGEM 2022 Gold** - The iGEM team from IIT Delhi led by students from the DBEB department has won the **Gold medal** at the **Grand Jamboree** held in Paris between October 26-28, 2022.

The team took on the challenge to tackle the problem of lead contamination in ground and waste water by applying Biotechnology principles learnt at IIT to engineer bacteria to bind lead. The team of 18 undergrads was led by Dhvani Teckchandani and Apar Ahuja under the supervision of Prof Preeti and Prof. Sundar with PhD Student Nidhi Patil as the Instructor.

Won 50 LAKHS grant from the **IIT DELHI ENDOWMENT NURTURE FUND** , for the **B2B Jewellery Platform**. This initiative is set up by alumni to encourage entrepreneurial talent among the students.

Madhukar Ranka (2019BB10035)

Dipanshu Verma (2019BB10021)

Twitter-

<https://twitter.com/iitdelhi/status/1590941584761442304?cxt=HHwWgMDSooa8LJQsAAAA>

Instagram- <https://www.instagram.com/p/Ckz1bn3DuJv/?igshid=YmMyMTA2M2Y=>

<https://www.instagram.com/p/CknOv19oeYr/?igshid=YmMyMTA2M2Y=>

Facebook

<https://www.facebook.com/2241392645909113/posts/pfbid027ijWTq7TtG9wiBvvHJAo6oZRmpResWT2LLSLW1dmdjefvmg4GjbHAAzgcFsidYBRI/?app=fbl>

- **Several students from the Department were endowed with Distinction in Doctoral Research this year**

Neeti Kalyani- Distinction in Doctoral Research for the Year 2018 Awarded by Indian Institute of Technology Delhi, **August 2022**

Pooja Murarka-Distinction in Doctoral Research for the Year 2019 Awarded by Indian Institute of Technology Delhi, **September 2022**

Omkar Suhas Vinchure- Distinction in Doctoral Research Award for the Year 2020, Awarded by Indian Institute of Technology Delhi, **September 2022**

Divya Singhi-Distinction in Doctoral Research for the Year 2020 Awarded by Indian Institute of Technology Delhi, **September 2022**

Other Student Awards

- **Silver Medal, B.Tech. and M.Tech in Biochemical Engineering & Biotechnology-** Priyanshi rajput, Ishank Agrawal,
- **Boss award** Priyanshi Rajput & Ayush Chachan (Jointly)
- **Leela Khushiram Cash award** Priyanshi Rajput
- **Srishti Srivastava- Prof. AR Rao Young Scientist Researcher Award** at 15th International Symposium on Recent Trends in Cancer Prevention and Interception- Bench to Bedside, February 2022 (*Supervisor- Prof. Ritu Kulshreshtha*)
- **Srishti Srivastava- Prof. T.K. Ghosh Memorial award**, IIT Delhi for “Best Ph.D thesis work in Biochemical Engineering and Biotechnology” 2022 (*Supervisor- Prof. Ritu Kulshreshtha*)
- **Indranil Mondal-Best Poster Award** at 16th International Cancer Symposium on Translational Chemoprevention and Brainstorming, November 2022; organized by School of Life Sciences and Special Centre for Systems Medicine, Jawaharlal Nehru University (JNU). (*Supervisor- Prof. Ritu Kulshreshtha*)
- **Ravi Raj Singh- Best Poster Award** at Drug Delivery Australia 2022 Conference, 24-25th November 2022; organised by Controlled Release Society, Australian Local Chapter held at University of South Australia, Adelaide, Australia. (*Supervisor- Prof. Ritu Kulshreshtha & Dr Amirali Popat*)
- **Ravi Raj Singh- 2022 Health World Travel Award** from School of Pharmacy, The University of Queensland, Australia to attend the Drug Delivery Australia 2022 Conference held at University of South Australia, Adelaide, Australia. (*Supervisor- Prof. Ritu Kulshreshtha & Dr Amirali Popat*)
- **Arti Tyagi- Student Conference Support Award at Photonics West 2022** organized by the International Society for Optics and Photonics (SPIE) at San Francisco, CA, USA. (*Supervisor- Prof. Ravikrishnan Elangovan*)

Prime Minister's Research Fellows (PMRF) Awardees

Two PhD students from our Department were selected for Prime Minister's Research Fellows (PMRF) Scheme

- **Preetha Ganguly (2020BEZ8521):** Carbon Nano-Dots for Anti-cancer Drug Delivery and Bio-sensing
- **Kolli Venkata Supraja (2020BEZ8516):**Development of algae based slow-release fertilizer

Students accepted for Exchange Program under MoUs signed with International University/Institutes

3. Significant Research Activities

The Department faculty has published several publications (>120) of which several are published in reputed International Journals such as *Trends in Biotechnology (IF-19.5)*, *Biomaterials (IF-15.3)*, *J Hazard Mater (IF-14.2)*, *Bioresource Technology (IF-11.8)*, *Cell Mol Life Sci (IF-9.2)*, *WIREs RNA (IF-9.34)*, *Environ. Pollution (IF-8.0)* etc.

A detailed list of the publications is given in **Section 4** below. The DBEB faculty have also actively participated in various National and International Conferences/Symposium and published Conference Abstracts/Papers. DBEB faculty have got funding under MFIRP schemes such as (IITD-HUJI, IITD-TU Deft, IITD-New Zealand), International agencies IFCPAR (CEFIPRA) and major National funding agencies like DBT, SERB and ICMR.

Workshop organized by the Department

Anti Microbial Resistance Dx Bootcamp, 28-29th March 2022

Initiatives in Health Research at DBEB (CY 2022)

Non-invasive technology for disease diagnosis in animals

Research conducted in the laboratory of Prof. Ravikrishnan Elangovan was featured in **The Tribune** spotlight on May 24, 2022. Prof. Elangovan's group in collaboration with Dr. Naresh Kumar of National Dairy Research Institute (NDRI) have developed a new innovative technology for rapid detection of clinical and sub-clinical mastitis in dairy animals.

Covid Research

Prof. Ishaan Guptain collaboration with AIIMS, submitted first COVID-19 virus sequences that were isolated from lung tissue in India (Budhraj et al 2022). Gupta lab published one of the largest studies studying the etiology of COVID-19 in cancer patients with NCI-Jhajjar (Kumar et al 2022).

Cancer Research

NZ Centre IIT Delhi Virtual Summit (Cancer Epigenomics)

Strengthening of New-Zealand IITD collaborative research efforts in the field of Cancer Epigenomics by obtaining two joint research grants by Prof. Ritu Kulshreshtha and Prof. Ishaan Gupta.

Strengthening AIIMS New Delhi-IITD collaboration

The DBEB faculty have several joint projects with AIIMS New Delhi. Prof. Kulshreshtha is co-supervising three PhD students from AIIMS, New Delhi. Prof. Ishaan Gupta started the interaction with interested MBBS-MD oncologists at AIIMS who wish to pursue a part-time PhD students at IITD to establish foundations for a future Precision Medicine program at IITD. In collaboration with KSBS, we have enrolled 1 senior oncologist in the SiRE PhD program and have floated a project for a second part-time PhD candidate.

4. Scientific articles published in the CY 2022

- 1) Shukla, R., Ahammad, S.Z.
[Performance evaluation and microbial community structure of a modified trickling filter and conventional activated sludge process in treating urban sewage](#)
(2022) Science of the Total Environment, 853, art. no. 158331, . Cited 1 time.
- 2) Kuleshova, T., Rao, A., Bhadra, S., Garlapati, V.K.,
Sharma, S., Kaushik, A., Goswami, P., Sreekirshnan,
T.R., Sevda, S.
[Plant microbial fuel cells as an innovative, versatile agro-technology for green energy generation combined with wastewater treatment and food production](#)
(2022) Biomass and Bioenergy, 167, art. no. 106629, .
- 3) Sivaraman, G.K., Gupta, S.S., Visnuvinayagam, S., Muthulakshmi, T., Elangovan, R.,
Perumal, V., Balasubramaniam, G., Lodha, T., Yadav, A.
[Prevalence of S. aureus and/or MRSA from seafood products from Indian seafood products](#)
(2022) BMC Microbiology, 22 (1), art. no. 233, .
- 4) Tyagi, A., Singh, S., Pandey, V., Kumar, S., Mallik, P.S., Elangovan, R.
[SNC-TIRS: Label-Free Single Nanoparticle Characterization System Based on Total Internal Reflection Scattering Signal](#)
(2022) Particle and Particle Systems Characterization, 39 (12), art. no. 2200130, .
- 5) Kumar, S., Ramamurthy, C., Choudhary, D., Sekar, A., Patra, A., Bhavesh, N.S.,
Vivekanandan, P. [Contrasting roles for G-quadruplexes in regulating human Bcl-2 and virus homologues KSHVKS-Bcl-2 and EBV BHRF1](#)
(2022) Scientific Reports, 12 (1), art. no. 5019, . Cited 2 times.
- 6) Dutta, H., Kaushik, G., Dutta, V.
[Wastewater-based epidemiology: a new frontier for tracking environmental persistence and community transmission of COVID-19](#)
(2022) Environmental Science and Pollution Research, 29 (57), pp. 85688-85699.
- 7) Sharma, D., Sreekrishnan, T.R., Ahammad, S.Z.
[Modeling biofilm and development of rate law expressions for biofilm kinetics](#)

- (2022) Chemical Engineering Journal Advances, 12, art. no. 100419, .
- 8) Chatterjee, A., Kulshreshtha, R.
[Editorial: Role of epigenetic regulators in the initiation, progression, and metastasis of cancer](#)
(2022) Frontiers in Genetics, 13, art. no. 978097, .
 - 9) Priyanka, Bhattacharjee, A., Srivastava, P., Sharma, S.
[Employing mutants to study the role of a three-membered bacterial consortium in growth promotion of *Cajanus cajan*](#)
(2022) Journal of Microbiological Methods, 202, art. no. 106589, .
 - 10) Pradhan, S., Tyagi, R., Sharma, S.
[Combating biotic stresses in plants by synthetic microbial communities: Principles, applications and challenges](#)
(2022) Journal of Applied Microbiology, 133 (5), pp. 2742-2759.
 - 11) Priyanka, Srivastava, S., Sharma, S.
[Metabolomic insight into the synergistic mechanism of action of a bacterial consortium in plant growth promotion](#)
(2022) Journal of Bioscience and Bioengineering, 134 (5), pp. 399-406.
 - 12) Narisetty, V., Adlakha, N., Kumar Singh, N., Dalei, S.K., Prabhu, A.A., Nagarajan, S., Naresh Kumar, A., Amruthraj Nagoth, J., Kumar, G., Singh, V., Kumar, V.
[Integrated biorefineries for repurposing of food wastes into value-added products](#)
(2022) Bioresource Technology, 363, art. no. 127856, .
 - 13) Ahmad Wani, A., Shahadat, M., Wazed Ali, S., Ziauddin Ahammad, S., Kashif Uddin, M.
[Recent advances and future perspectives of polymer-based magnetic nanomaterials for detection and removal of radionuclides: A review](#)
(2022) Journal of Molecular Liquids, 365, art. no. 119976, . Cited 2 times.
 - 14) Singh, J., Vashishtha, S., Rahman, S.A., Ehtesham, N.Z., Alam, A., Kundu, B., Dobrindt, U.
[Energetics of Spike Protein Opening of SARS-CoV-1 and SARS-CoV-2 and Its Variants of Concern: Implications in Host Receptor Scanning and Transmission](#)
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(2022) Chemical Science, 13 (44), pp. 12987-12995.
 - 16) Fatima, S., Ali, M., Quadri, S.N., Beg, S., Samim, M., Parvez, S., Abdin, M.Z., Mishra, P., Ahmad, F.J. [Crafting \$\gamma\$ -L-Glutamyl-L-Cysteine layered Human Serum Albumin-nanoconstructs for brain targeted delivery of ropinirole to attenuate cerebral ischemia/reperfusion injury via "3A approach"](#)
(2022) Biomaterials, 289, art. no. 121805, .
 - 17) Yadav, S.P.S., Yu, A., Zhao, J., Singh, J., Kakkar, S., Chakraborty, S., Mechref, Y., Molitoris, B., Wagner, M.C.
[Glycosylation of a key cubilin Asn residue results in reduced binding to albumin](#)
(2022) Journal of Biological Chemistry, 298 (10), art. no. 102371, .

- 18) Joshi, D., Prakash, G.V., Ahammad, S.Z., Kar, S., Sreekrishnan, T.R.
[Development of low power non-thermal plasma jet and optimization of operational parameters fortreating dyes and emerging contaminants](#)
(2022) *Plasma Science and Technology*, 24 (10), art. no. 105501, .
- 19) Tyagi, A., Khaware, N., Tripathi, B., Jeet, T., Balasubramanian, P., Elangovan, R.
[i-scope: a compact automated fluorescence microscope for cell counting applications in low resourcesettings](#)
(2022) *Methods and applications in fluorescence*, 10 (4), .
- 20) Meidinna, H.N., Shefrin, S., Sari, A.N., Zhang, H., Dhanjal, J.K., Kaul, S.C., Sundar, D., Wadhwa, R. [Identification of a new member of Mortaparib class of inhibitors that target mortalin and PARP1](#)(2022) *Frontiers in Cell and Developmental Biology*, 10, art. no. 918970, .
- 21) Farhat, N., Gupta, D., Ali, A., Kumar, Y., Akhtar, F., Kulanthaivel, S., Mishra, P., Khan, F., Khan, A.U. [Broad-Spectrum Inhibitors against Class A, B, and C Type b-Lactamases to Block the Hydrolysisagainst Antibiotics: Kinetics and Structural Characterization](#)
(2022) *Microbiology Spectrum*, 10 (5), .
- 22) Sampath, G., Chen, Y.-Y., Rameshkumar, N., Krishnan, M., Nagarajan, K., Shyu, D.J.H.
[Biologically Synthesized Silver Nanoparticles and Their Diverse Applications](#) (2022) *Nanomaterials*, 12 (18), art. no. 3126, . Cited 1 time.
- 23) Singh, S., Pathak, A., Kumar, S., Malik, P.S., Elangovan, R.
[Rapid immunomagnetic co-capture assay for quantification of lung cancer associated exosomes](#)
(2022) *Journal of Immunological Methods*, 508, art. no. 113324, .
- 24) Singh, U., Roy, P., Sharma, S.
[Bacterial inoculants as effective agents in minimizing the non-target impact of azadirachtin pesticideand promoting plant growth of Vigna radiata](#)
(2022) *Archives of Microbiology*, 204 (9), art. no. 555, .
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[Next generation biosensors employing molecularly imprinted polymers as sensing elements for invitro diagnostics](#)
(2022) *Biosensors and Bioelectronics: X*, 11, art. no. 100201,
- 26) Dubey, S., Anand, A., Bhattacharjee, A., Khatri, S., L'Haridon, F., Weisskopf, L., Sharma, S. [Understanding the mechanism of action of stress-acclimatized rhizospheric microbiome towardssalinity stress mitigation in Vigna radiata: A focus on the emission of volatiles](#)
(2022) *Environmental and Experimental Botany*, 201, art. no. 104988, . Cited 1 time.
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- 28) Gupta, S., Sreekrishnan, T.R., Ahammad, S.Z.
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(2022) *Environmental Pollution*, 308, art. no. 119649, . Cited 3 times.
- 29) Singh, U., Choudhary, A.K., Varatharajan, T., Sharma, S.

Agricultural Management Practices Affect the Abundance of Markers of Phosphorus Cycle in Soil:Case Study with Pigeonpea and Soybean

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- 30) Nath, S.
Network representation and analysis of energy coupling mechanisms in cellular metabolism by a graph-theoretical approach
(2022) Theory in Biosciences, 141 (3), pp. 249-260. Cited 1 time.
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Development of Hypertolerant Strain of Yarrowia lipolytica Accumulating Succinic Acid Using High Levels of Acetate
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Removal of antibiotics and pharmaceutically active compounds from water Environment: Experiment towards industrial scale up
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Characterization of divergent promoters PmaiA and Phyd from Gordonia: Co-expression and regulation by CRP
(2022) Biochimica et Biophysica Acta - Gene Regulatory Mechanisms, 1865 (6), art. no. 194843, . Cited 1 time.
- 34) Vora, D.S., Verma, Y., Sundar, D.
A Machine Learning Approach to Identify the Importance of Novel Features for CRISPR/Cas9 Activity Prediction
(2022) Biomolecules, 12 (8), art. no. 1123, .
- 35) Sharma, J., Kalakoti, Y., Srivastava, P., Sundar, D.
Genome Sequence of a Potent Biosurfactant-Producing Bacterium, Franconibacter sp. Strain IITDAS19
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- 36) Nath, S.
Corrigendum to “Modern theory of energy coupling and ATP synthesis: Violation of Gauss's law by the chemiosmotic theory and validation of the two-ion theory” [Biophysical Chemistry 2019, 255:106271] (Biophysical Chemistry (2019) 255, (S0301462219303448), (10.1016/j.bpc.2019.106271))
(2022) Biophysical Chemistry, 287, art. no. 106826, .
- 37) Narisetty, V., Zhang, L., Zhang, J., Sze Ki Lin, C., Wah Tong, Y., Loke Show, P., Kant Bhatia, S., Misra, A., Kumar, V.
Fermentative production of 2,3-Butanediol using bread waste – A green approach for sustainable management of food waste
(2022) Bioresource Technology, 358, art. no. 127381, . Cited 5 times.
- 38) Dandapath, I., Gupta, R., Singh, J., Shukla, N., Jha, P., Sharma, V., Suri, A., Sharma, M.C., Suri, V., Sarkar, C., Kulshreshtha, R.
Long Non-coding RNA and mRNA Co-expression Network Reveals Novel Players in Pleomorphic Xanthoastrocytoma
(2022) Molecular Neurobiology, 59 (8), pp. 5149-5167.
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Effects of heavy metals pollution on the co-selection of metal and antibiotic resistance

in urban rivers in UK and India

(2022) Environmental Pollution, 306, art. no. 119326, . Cited 5 times.

- 40) Ahlawat, A., Jaswal, A.S., Mishra, S.
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(2022) Polymer, 254, art. no. 124975, . Cited 5 times.
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(2022) International Journal of Medical Microbiology, 312 (5), art. no. 151558, .
- 44) Sharma, S., Moudgil, A., Singh, S., Das, S., Mishra, P.
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[Yeast-Mycelial Dimorphism in *Pichia pastoris* SMD1168 Is Triggered by Nutritional and Environmental Factors](#)
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5. IPR applications filed and technology licenses executed in the CY 2021

1. Das S, **Mishra P**, Singh S, Moudgil A, Sharma S. Field-effect transistor device and a method of fabrication thereof. Provisional Application No 202111060105 Date of filing 22/12/2021) Final complete application filled on 22/12/2022.
2. **Mishra P** and Shrivastav G. Identification of a DNA Aptamer For Prostate Cancer Oncogene Provisional patent Application No: 202211058823 Date of filing 14/10/2022.

6. Research Grants and Support

6.1 Intramural project awarded in CY2022

S.No	Project Title	Sponsoring Agency	Amount of support (in INR lacs)	Period	Name
1.	Microbiome-based strategy for mitigation of drought stress: a physical answer to a biological observation (Under MFIRP Scheme of IRD in collaboration with HUJI)	IRD, IIT Delhi India	500000.00	01-08-2022 31-07-2023	Shilpi Sharma
2.	Deciphering the genome-wide DNA methylation and transcriptomic signature of hypoxia in meningioma (Under MFIRP Scheme of IRD in collaboration with New Zealand Universities)	IRD, IIT Delhi India	400000.00	05-07-2022 04-07-2023	Ritu Kulshreshtha
3.	Discovering novel long non-coding RNA associated with epigenetic	IRD, IIT Delhi India	400000.00	05-07-2022 04-07-2023	Ishaan Gupta

	signatures colorectal cancer and dissecting their role in tumor heterogeneity (MFIRP scheme of IRD under Jt. Call for IITD & New Zealand University)				
4.	Learning from organic agriculture: identifying the natural disease suppression mechanisms of organic soils (Under MFIRP Scheme of IRD in collaboration with TU Delft)	IRD, IIT Delhi India	500000.00	04-07-2022 03-07-2023	Shilpi Sharma
5.	Oral microbiome as a predictor of eventual progressive liver disease (Under MFIRP Scheme of IRD in collaboration with ILBS)	IRD, IIT Delhi India	500000.00	14-03-2022 13-03-2023	Ishaan Gupta
6.	Equipment Matching Grant to Prof. Ishaan Gupta from IRD funds under RP04242	IRD, IIT Delhi India	1269000.00	24-02-2022 31-12-2022	Ishaan Gupta
7.	MI for the operation of DBEB Instrumentation Facility	IIT Delhi - DBEB Instrumentation Facility users India	1.00	08-02-2022 07-02-2025	Ritu Kulshreshtha

6.2 Other Intramural project currently under progress CY2022

S. No	Project Title	Sponsoring Agency	Amount of support (in INR lacs)	Period	Name
1.	Boosting the bio-electrode: electroactive biofilms enhanced with electrochemically deposited nanomaterials (Under IRD MFIRP scheme in collaboration with HUJI)	IRD, IIT Delhi India	1000000.00	15-06-2021 11-08-2023	Lucinda Elizabeth Doyle
2.	Development of a low-cost, wide-range, and on-line sensor of biomass concentrations in bioreactors. (Under FIRP Scheme of IRD)	IRD, IIT Delhi India	400000.00	19-04-2021 18-04-2023	Atul Narang
3.	Clean Drain-IITD	IRD, IIT Delhi India	2740000.00	14-03-2019 31-12-2022	Shaikh Ziauddin Ahammad
4.	Institute Ethics Committee - IITD	IRD, IIT Delhi India	1220000.00	01-12-2018 18-09-2023	Ravi Krishnan Elangovan

6.3 Extramural project awarded this CY2022

S. No	Project Title	Sponsoring Agency	Amount of support (in INR lacs)	Period	Name
1.	Engineering rhizosphere microbiota for enhanced resistance to plant disease and human pathogens through compost amendments (IFCPAR)	IFCPAR (CEFIPRA), India Habitat Centre India	8077716.00	15-04-2022 14-04-2025	Shilpi Sharma
2.	Plastic biodegradation using microbial consortia and engineered microorganisms & enzymes with focus on Polyethylene (PE) and Polypropylene (PP)	ITC Limited India	10000000.00	01-04-2022 30-06-2023	Preeti Srivastava
3.	Elucidation of mechanism of bacterial adherence on fabrics to limit the spread of nosocomial infections (SERB NPDFship to Dr. Shweta Dixit Under the Supervision of Prof. Shilpi Sharma, DBEB)	Science and Engineering Research Board (SERB) India	2236800.00	02-03-2022 01-03-2024	Shilpi Sharma
4.	Development of point-of-care cartridge based isothermal nucleic acid amplification assay for viral load estimation of HCV (ICMR Fellowship Ada Zwetlana)	Indian Council of Medical Research India	461167.00	01-03-2022 31-12-2022	Ravi Krishnan Elangovan
5.	Development of systematic methods for overcoming catabolite repression in Escherichia coli	Science and Engineering Research Board (SERB) India	5017606.00	23-02-2022 22-02-2025	Atul Narang
6.	Elucidating the role of circular RNA circLIFR in the pathogenesis of small cell lung cancer	Science and Engineering Research Board (SERB) India	165000.00	21-01-2022 20-01-2025	Ishaan Gupta
7.	APP-DIP: Development of AI based prognostic platform for an early detection of infections in immunocompromised	Department of Biotechnology, Ministry of Sc.& Tech India	5858176.00	03-01-2022 202202-01-2025	Ishaan Gupta

	patients				
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6.4 Other extramural project currently under progress CY2022

S. No	Project Title	Sponsoring Agency	Amount of support (in INR lacs)	Period	Name
1.	Enhanced production of Piperine using elicitation by endophytes (Under TARE Scheme of SERB awarded to Dr. Sushma Mishra under the Mentorship of Prof. Shilpi Sharma, DBEB)	Science and Engineering Research Board (SERB) India	1005000.00	13-12-2021 12-12-2024	Shilpi Sharma
2.	Overcoming the problem of high oxygen demand by using formate instead of methanol to induce the AOX1 promoter of Komagataella phaffii (Pichia pastoris)	Department of Biotechnology, Ministry of Sc.& Tech India	3578000.00	15-11-2021 14-05-2023	Atul Narang
3.	Deciphering the role of microRNA-191 in regulation of chemoresistance and stemness in breast cancer	Department of Biotechnology, Ministry of Sc.& Tech India	3933520.00	22-09-2021 21-09-2024	Ritu Kulshreshtha
4.	Torrefaction based technology for the recovery of bio-coal, furfural and acetic acid from agriculture wastes	Department of Science and Technology (DST) India	19365358.00	05-07-2021 05-07-2024	Shaikh Ziauddin Ahammad

5.	microRNA nanotherapeutics for glioblastoma	Science and Engineering Research Board (SERB) India	4814758.00	25-03-2021 24-03-2024	Ritu Kulshreshtha
6.	ResPharm: Resolving the fate and studying the impact of pharmaceutical wastes on the environment and local community of a pharmaceutical manufacturing hub.	Department of Biotechnology, Ministry of Sc.& Tech India	5061760.00	30-12-2020 29-12-2023	Shaikh Ziauddin Ahammad
7.	SELECTAR: Selection for antimicrobial resistance by antimicrobial production waste	Department of Biotechnology, Ministry of Sc.& Tech India	8985200.00	16-12-2020 15-12-2023	Shaikh Ziauddin Ahammad
8.	Evaluation of potential diagnostic value of circRNA in meningiomas for risk stratification and its role in therapeutic intervention.	Indian Council of Medical Research India	1573428.00	01-12-2020 30-11-2023	Ritu Kulshreshtha
9.	An investigation of life history, breeding ecology and genomic consequences of adaptation to chronic protein deficiency using experimental evolution for live-yeast deprivation on Drosophila melanogaster populations	Science and Engineering Research Board (SERB) India	1419450.00	26-03-2020 25-03-2023	Ishaan Gupta
10.	Dissecting the mechanism and role of polyploidy associated alternative	Department of Biotechnology,GOI India	4250000.00	16-02-2020 15-02-2025	Ishaan Gupta

	splicing in liver aging and disease				
11.	GenomeIndia: Cataloguing the Genetic Variation in Indians	Department of Biotechnology, Ministry of Sc.& Tech India	14000000.00	16-01-2020 15-01-2023	D Sundar
12.	Novel laccases for degradation of complex dyes for textile waste water treatment	Department of Biotechnology, Ministry of Sc.& Tech India	6886160.00	01-10-2019 31-03-2023	T R Sreekrishnan
13.	Catalyzing diagnostic technology innovation from bench to bedside (Under SPARC scheme of MHRD)	Ministry of Human Resource & Development India	4743610.00	30-04-2019 31-03-2023	Ravi Krishnan Elangovan
14.	Engineered Bioremediation Approaches for Onsite treatment of soil contaminated with crude oil	Department of Biotechnology, Ministry of Sc.& Tech India	2955560.00	19-03-2019 18-03-2023	Preeti Srivastava
15.	Development of metagenomics assisted surveillance tools for tracking antibiotic resistance in river bodies (Nanolog)	Department of Biotechnology, Ministry of Sc.& Tech India	7930720.00	16-03-2019 31-12-2022	Shaikh Ziauddin Ahammad
16.	M. Tech Biochemical Engineering and Biotechnology Teaching programme at D.B.E.B. of the I.I.T. Delhi (Phase - 2 of MI00647)	Department of Biotechnology, Ministry of Sc.& Tech India	2956047.00	01-01-2019 31-12-2028	Shilpi Sharma
17.	Biotechnology for the recovery of germanium, indium and copper from industrial copper dust waste (Bio-	Indo German Science and Technology Centre Germany	16100000.00	18-04-2018 31-12-2022	Shaikh Ziauddin Ahammad

	CuInGe)				
18.	MI for the operation of DDF at DBEB	Indian Institute of Technology Delhi India	2007367.00	15-06-2009 30-06-2030	Ritu Kulshreshtha

7. Students who graduated in the CY 2022

7.1. Doctor of Philosophy (Ph.D.)

a) PhD Thesis details

Sl.	Name of the Student	PhD Thesis Title	Supervisor(s)
1	Manju	Treatment of complex dyes and effluents using engineered Laccase 1 of <i>Cyathus bulleri</i>	Prof Preeti Srivastav and Prof. Saroj Mishra
2	Swati Varshney	Studies on Bacterial Diversity on fabrics	Prof. Shilpi Sharma
3	Arif Nissar Zargar	Asphaltene Biotransformation for heavy oil upgradation by a defined microbial Consortium	Prof. Preeti Srivastava
4	Srishti Srivastava	Investigating the Role of mediator complex subunit, med12 in Glioblastoma	Prof. Ritu Kulshreshtha
5	Rabab Anjum	Mass production of Shikimic Acid (RAW material for Tamiflu) from Plant Cell Culture	Prof A K Srivastava

(b) Current position of graduated PhD students

Sl.	Name of the Student	Current Position	Current Affiliation
1	Manju		
2	Swati Varshney	Scientist B	AIIMS New Delhi
3	Arif Nissar Zargar	Research Associate	DBEB, IIT Delhi
4	Srishti Srivastava	Science Writer- Molecular Biology	JOVE
5	Rabab Anjum		

7.2 Master of Science (Research) in Biochemical Engineering and Biotechnology (MSR)

(a) MSR thesis details

Sl.	Name of the Student	PhD Thesis Title	Supervisor(s)
1	Anshul Budhraj	Dissecting lung pathophysiologies with RNA-SEQ Analysis using multifunctional Utility	Prof. Ishaan Gupta
2	Rajat Anand	Identification of Key Genes and ncrnas Associated with Temozolomide and Radiation Response in GBM	Prof. Ritu Kulshreshtha
3	Shravya Velamala	Identification of potential Biomarkers and	Prof. Ritu

		prominent players among bHLH family Genes in glioblastoma	Kulshreshtha
4	M Apurva	Carbon Catabolite Repression in SACCHAROMYCES CEREVISIAE	Prof. Atul Narang
5	Sourabh G Chavan	Investigating the role of Enzymes for Biotransformation of Asphalenes	Prof. Preeti Srivastava

(b) Current position of graduated MSR students

Sl.	Name of the Student	Current Position	Current Affiliation
1	Anshul Budhreja	PhD	University of Montreal, Canada
2	Rajat Anand	PhD	DWI-Leibniz Institute
3	Shravya Velamala		
4	M Apurva	JRF	IIT Delhi
5	Sourabh G Chavan		

7.3 Five-year dual program

Master of Technology in Biochemical Engineering and Biotechnology and Bachelor of Technology in Biochemical Engineering and Biotechnology

Sl.	Name of the Student	Current Position	Current Affiliation
1	Surendra Firoda	Software Engineer	Google
2	Kartikey Karnatak	Associate	Boston Consultancy Group (BCG India)
3	Vikas Singal		
4	Aniket Patel	Software Development Engineer	Standard Charter
5	Anirudh Modi	Analyst	IQVIA
6	Mrigank Nehra	Management Trainee	Property Pistol
7	Narendra Kumar Meena		EXL Analytics
8	Priyanshi Rajput	Data Scientist	Infedge
9	Anuj Khandelwal		
10	Diwakar Kamal	Analyst	Axtria
11	Harsheet Chaudhary	Associate Consultant	PwC
12	Kshitij Sahu		
13	Ayush Chachan	Software Developer Engineer	Hello Verify Pvt Ltd
14	Madishetty Saiteja	Analyst	IQVIA

7.4. Bachelor of Technology in Biochemical Engineering and Biotechnology

Sl.	Name of the Student	Current Position	Current Affiliation
1.	Abhay Kumar		

2.	Adarsh Vrindam		
3.	Aditya Prasad		
4.	Agrima Deedwania	Junior research scientist	Inito IIT Delhi
5.	Amritanshu		
6.	Anahad Sharma	Associate Product Manager	Zomato
7.	Anima Mandwariya	Young India Fellowship	Ashoka University
8.	Animesh Parihar		
9.	Anish Singh Rajawat	Software Engineer	Jaguar Land Rover
10.	Barri Bhavya		
11.	D Payal		
12.	Deepanshu Goel	Analyst, Investment Banking/Venture, Financial Services	Goldman Sachs
13.	Esha Singh		
14.	Geeta Kole Vishwanath		
15.	Harsh Dutta	PhD	NTU, Singapore
16.	Harshit Gupta		
17.	Himanshu Bhargava		
18.	Himanshu Singh		
19.	Ishank Agrawal	Data Engineer	WorldQuant
20.	Kavya Parnami	Associate	PwC US Advisory
21.	Mahesh Regar		
22.	Mayank Singh		
23.	Naveen Saharan		
24.	Nehal Chachan	Associate Consultant	Finmechanics IIT Delhi
25.	Nikhil Kumar Saiyam		
26.	Pranjal Singh	Software Engineer	Nference IIT Delhi
27.	Pratiyush Mishra		
28.	Rahul Sahu		

29.	Rathod Ruthik		
30.	Ravinder		
31.	Ruchika Kumari		
32.	Sanaz Agarwal	Student	Johns Hopkins University
33.	Sarthak Gupta		
34.	Shrey	Exl Service	
35.	Shubham Kumar		
36.	Sukhdev		

8. Miscellaneous

The Department welcomes our newly joined faculty members

Assistant Professor- Prof. Kumari Priti Sinha.

Assistant Professor-Prof. Anjan Roy

Assistant Professor- Prof. Amit Das

Major New Equipment Installed (costing Rs. 10 Lakh and above)

Following equipments funded by the IoE grant have been installed in the Department

- Multiplexed MS
- Triplequad MS attachemnt
- CO2 shaker incubator
- Spectrofluorometer with Probe
- NIR with probes

Infrastructure Development- New Lab Built/Major Modifications

Functional Genomics Laboratory

New Programme Introduced by the Department

M.Tech (Biomolecular and Bioprocess Engineering)

New Courses Developed by the Department

- BBL771 Microbial Biochemistry and molecular biology

- BBL772 Data Analytics and informatics in Biotechnology
- BBL773 Applied Mathematics for Biochemical Engineering
- BBL774 Biomolecular Engineering
- BBL775 Bioreaction Engineering

National and International Collaborations

Some of the New International collaborations are given below:

Prof. Shilpi Sharma, International collaboration under IFCPAR (CEFIPRA)

Prof. Lucinda E. Doyle and Prof. Gordon Southam, University of Queensland.

Prof. Lucinda E. Doyle and Prof. Daniel Mandler, Hebrew University of Jerusalem Israel.

Prof. Ishaan Gupta and Prof. Vicente Pelechano (Karolinska University, Sweden) on an Indo-Sweden (DBT-Vinnova) Joint Call for proposals in Artificial intelligence in Healthcare.

Prof. Ishaan Gupta and Prof. Maribel Hernandez (CINEVESTAV) on projects in mathematical biology.

Prof. Ishaan Gupta with Prof. Ernst Wolventag and Prof. Quan Nguyen in 1 joint project each for UQUIDAR PhD program

Prof. Ritu Kulshreshtha and Prof. Amirali Popat, University of Queensland, Australia in 1 joint project each for UQUIDAR PhD program

Prof. Ritu Kulshreshtha and Prof. Aniruddha Chatterjee, University of Otago, New Zealand in 1 joint project

Prof. Ishaan Gupta and Prof. Aniruddha Chatterjee, University of Otago, New Zealand in 1 joint project



Ritu Kulshreshtha
HoD, DBEB

Biochemical Engineering and Biotechnology | IIT Delhi

