

DEPARTMENTAL PROFILE



Department of Biotechnology
Guru Nanak Dev University
Amritsar

STRENGTHS OF THE DEPARTMENT

(Established in 1991)

- Faculty members are highly qualified with specialization in different core areas of Biotechnology
- Several Research Projects sanctioned by DBT, CSIR, DST, ICMR, DRDO, AICTE etc.

Sanctioned DST-FIST grant of Rs. 1.10 Crores (2014-2019)

- Well equipped laboratories to impart training in different area of Biotechnology

Faculty Profile

S. No.	Faculty	Qualification	Designation	Specialization
1	Dr. Pratap Kumar Pati (Head)	M.Tech. (IIT Kharagpur) Ph.D., (CSIR-IHBT, Palampur)	Professor	Plant Tissue Culture & Genetic manipulation
2	Dr. Prabhjeet Singh	Ph.D., (IARI, New Delhi)	Professor	Plant Molecular Biology
3	Mr. Pramod Kumar Verma	M.Tech. (I.I.T., New Delhi)	Associate Professor	Biochemical Engineering
4	Dr. Prakash Chandra Mishra	Ph.D. (ICGEB, New Delhi)	Assistant Professor	Structural Biology
5	Dr. Aditya Sunkaria	Ph.D. (PGIMER, Chandigarh)	Assistant Professor	Animal Biotechnology
6	Dr. Gurcharan Kaur	Ph.D. (JNU, New Delhi)	University Honorary Professor	Animal Biotechnology

Curricular Activities

M. Sc. Biotechnology

- Admission through All India Combined Entrance Examination (AICEE) conducted by the JNU, New Delhi and GNDU entrance examination
- Students selected through AICEE in Biotechnology are awarded a scholarship of Rs. 5,000 P.M. during M.Sc. Biotechnology.
- Majority of students qualify national level exams like NET/GATE/DBT-JRF test etc.
- 74.46% of students get placement in reputed institutes for Ph.D program and absorbed in industry

Ph.D. Program

Through National Level Tests (CSIR-JRF, GATE etc.) and Ph.D. Eligibility Test conducted by the University

Achievements during Ph. D

- Nehru-Fulbright Doctoral Scholarship - 2
- DAAD Fellowship-1
- BINC Test (Bioinformatics National Certification)-1
- IBRO-APRC Fellowship-1
- IBRO Travel Award-1
- ISN Travel Award-1
- APSN Travel Award-1
- JNS Travel Award-1
- AIST-Japan Fellowship-3
- JST Travel Award-5
- Young Scientist Award-3

Overseas Placements after Ph. D

- Ghent University, Belgium. (BELSPO fellowship)
- Roslin Technologies, U.K.
- Max Planck Institute for Developmental Biology, Germany.
- University of Manitoba, Canada.
- University of Illinois, Chicago, USA.
- University of Nebraska, USA.
- Karolinska Institute, Sweden.
- University of Notre Dame, Australia.

Medical Biotechnology

- Therapeutic potential applications of glyco mimetics for spinal cord injuries.
- Scientific validation of natural products for development of differentiation-based therapy of brain diseases.
- Understanding the role of Glia in Health & Disease

Plant Biotechnology

- Deciphering strategies for abiotic stress tolerance in plants.
- Biotechnological intervention in the improvement of medicinal plants.

NICHE AREAS OF RESEARCH

Microbial Biotechnology

Characterization of cellulolytic micorganisms

Structural and Computational Biology

Structural and functional studies of malarial drug targets.

Research Projects

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
ONGOING RESEARCH PROJECTS					
1	Neurocognitive correlates of childhood and adolescent obesity: search for potential biomarkers and interventions.	2020-2023	DST-CSRI	55.00	Prof. Gurcharan Kaur
2	Strategic induction of microglial cells to develop early biomarkers and novel molecular targets for Alzheimers disease – A secretome analysis.	2020-2023	ICMR, New Delhi	45.00	Dr. Aditya Sunkaria
3	Development of elite cultivars of <i>Withania somnifera</i> and its Rapid Multiplication Using Biotechnological Approaches	2020-2022	RUSA, MHRD	15.00	Prof. P.K. Pati
4	Exploring potential of Fractalkine binding peptides for suppressing SLE	2020-2022	RUSA, MHRD	15.00	Dr. P.C. Mishra
5	Identification and Characterization of Salt-induced Cyclophilins from a Stress Tolerant Penicillium strain and their Implications in Stress Tolerance	2019-2022	CSIR	27.00	Prof. Prabhjeet Singh

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
6	Elucidating the Mechanism of Interaction of Calmodulin with a Sorghum Glycine-Rich RNA-Binding Protein	2019-2022	DST-SERB	49.8	Prof. Prabhjeet Singh
7	<i>In vitro</i> mass propagation of High value hill area Banana. (Multi-Institutional Project)	2018-2021	DBT	26.43	Prof. P.K. Pati
8	Deciphering strategies for development of leaf spot disease resistant <i>Withania somnifera</i> (L.) Dunal.	2018-2021	CSIR	37.00	Prof. P.K. Pati
9	Investigations of polysialic acid mimetics in nervous system injury and disease	2017-2020	DST	47.00	Prof. Gurcharan Kaur
COMPLETED RESEARCH PROJECTS					
10	Study of molecular and cellular basis of obesity associated neuroinflammation and the role of natural products as neuroprotective agents	2015-2019	DBT	40.00	Prof. Gurcharan Kaur
11	Behavioral and molecular study of relationship between chronic sleep deprivation and cognitive impairments	2015-2019	DST	40.00	Prof. Gurcharan Kaur

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
12	Role of peptidyl prolyl cis-trans isomerases in acquisition of thermos tolerance in wheat	2015-2018	DBT	47.63	Prof. Prabhjeet Singh
13	Sulforaphane mediated activation of protein degradation machinery: A strategic approach against the pathogenesis of Alzheimer's disease.	2015-2018	DST-SERB	30.60	Dr. Aditya Sunkaria
14	Development of In vitro Regeneration System (Cell suspension & Protoplast) and Comparative Analysis of Bioactive Compounds of Rhodiola Species, a High Value Medicinal Plant from Trans-Himalayan Region of Ladakh.	2015-2017	DRDO	8.80	Prof. P.K. Pati
15	Structure-function analysis of plant NADPH oxidase.	2014-2018	DBT	58.50	Prof. P.K. Pati
16	Structure-function analysis of an exported parasite protein	2013-2017	DBT	43.64	Dr. P.C. Mishra
17	Developing fungal strains for enzyme production through mutagenesis, protoplast fusion and over-expression using A. niger citrate synthase promoter. (Multi-Institutional Project)	2013-2016	DBT	26.00	Prof. P.K. Pati

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
18	Heat Stress-Induced Calmodulin-Binding Proteins in Sorghum: Characterization, Cloning and Expression Analysis	2011-2014	DBT	64.85	Prof. Prabhjeet Singh
19	Investigations on the therapeutic potential applications of PSA mimetics in cell culture and mouse models of brain injury and disease	2011-2014	ICMR-BMBF Germany	45.00	Prof. Gurcharan Kaur
20	Development of a Molecular Detection System for Alternaria species infecting Withania somnifera (L) and analysis of postinfectional changes during leaf spot disease using biochemical and molecular approaches.	2011-2014	CSIR	21.70	Prof. P.K. Pati
21	Insight into 24-epibrassinolide mediated synthesis of protective proteins and enzymes in Brassica juncea L. under copper stress.	2011-2014	CSIR	20.00	Prof. P.K. Pati
22	Structure-function studies on a conserved essential malaria parasite protein containing PEXEL motif	2011-2014	DBT	26.48	Dr. P.C. Mishra

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
23	Use of Ashwagandha derived phytochemicals for development of differentiation-based therapy of brain cancers	2010-2014	DBT	75.00	Prof. Gurcharan Kaur
24	Cellular and molecular mechanisms of adverse effects of antiepileptic and mood stabilizing drugs	2010-2014	DBT	59.00	Prof. Gurcharan Kaur
25	Insights into secondary metabolite production and their accumulation in Withania somnifera using in vitro propagation system.	2010-2014	DBT	92.00	Prof. P.K. Pati
26	Reproductive neuroendocrine dysfunction in cycling female rats treated with antiepileptic drugs	2010-2013	UGC	12.00	Prof. Gurcharan Kaur
27	Brain Plasticity associated with cerebral malaria	2010-2012	DBT	25.26	Dr. P.C. Mishra
28	Transgenic analysis for the role of wheat gene (TaVAP) encoding for a vesicle-associated membrane protein-associated protein in abiotic stress tolerance	2008-2011	DBT	33.28	Prof. Prabhjeet Singh

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
29	Peptidyl prolyl cis trans isomerases Role in storage protein deposition in wheat and relevance to industry	2008-2011	DBT	86.74	Prof. Prabhjeet Singh
30	Insights into brassinosteroids-regulated defense system of Raphanus sativus under heavy metals stress using biochemical and molecular approaches.	2008-2011	DST	28.00	Prof. P.K Pati
31	Molecular and biochemical approaches to study brassinosteroids mediated responses in rice under pesticides and salt stress.	2008-2011	UGC	11.94	Prof. P.K Pati
32	Juxtacrine and/or paracrine control of Brain plasticity (From Indo-French Centre for promotion of advanced research) in collaboration with Dr. Vincent Prevot, INSERM, Lille, France	2007-2011	IFCPAR	78.00	Prof. Gurcharan Kaur
33	Reversing Age Related Brain Functions Impairments by Late Onset Dietary Restriction	2007-2011	ICMR	30.00	Prof. Gurcharan Kaur

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
34	Neurogenesis in the Subventricular Zone and Neocortex of Adult Rat: Interactive Effects of Excitotoxic Injury and Dietary Restriction	2006-2008	ICMR	13.00	Prof. Gurcharan Kaur
35	Purification and characterization of stress-induced calmodulin-binding proteins from Sorghum	2005-2010	DBT	32.72	Prof. Prabhjeet Singh
36	Studies on correlation of drought-induced peptidyl prolyl cistrans isomerase activity and drought tolerance in wheat	2004-2006	DBT	8.42	Prof. Prabhjeet Singh
37	Neuronal Plasticity in Adult brain: Study of molecular markers of synaptic remodeling in hypothalamic GnRH- astroglial cells	2002-2005	DBT	24.00	Prof. Gurcharan Kaur
38	Identification cloning and characterization of stress inducible genes in the grains of wheat at different stages of development	2001-2004	CSIR	17.98	Prof. Prabhjeet Singh
39	Molecular cloning and characterization of inulinase gene(s) from Aspergillus fumigatus	2001-2004	DBT	11.86	Prof. Prabhjeet Singh

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
40	Role of DNA fragmentation and prolonged Immediate early gene in the expression of neuropathology of diabetes and hypoglycemia in rat.	2000-2003	ICMR	8.50	Prof. Gurcharan Kaur
41	Studies on the role of cyclophilin gene in water stress tolerance of sorghum and cowpea	1999-2000	DBT	9.91	Prof. Prabhjeet Singh
42	Impact of Diabetes on CNS: Role of mitochondrial dysfunction.	1999-2000	TWAS, Italy	3.01	Prof. Gurcharan Kaur
43	Bidirectional communication between nervous and immune systems. Implications for therapeutic strategies	1998-2000	AICTE	6.00	Prof. GurcharanKaur
44	Purification, characterization and process optimization of thermostable inulinase for commercial application	1997-2000	AICTE	5.00	Prof. Prabhjeet Singh
45	Cloning and molecular characterization of thermostable inulinase gene from thermophilic actinomycetes	1997-1999	DBT	6.53	Prof. Prabhjeet Singh

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
46	The Impact of Diabetes on CNS: Role of Glutamate receptors oxidative stress and signal transduction system	1996-1999	CSIR	7.20	Prof. Gurcharan Kaur
47	Diabetes and neuronal degeneration: Role of excitotoxic mechanisms	1996-1997	TWAS, Italy	2.23	Prof. Gurcharan Kaur
48	Alterations in signal transduction and Immune responses in aging Brain. Implications for therapeutic strategies	1995-1998	AICTE	6.00	Prof. Gurcharan Kaur
49	Effect of opioid peptides on hypothalamic control of neuroendocrine factors release mechanisms.	1993-1996	UGC	5.50	Prof. Gurcharan Kaur
50	Diabetes induced alterations in hypothalmo hypophyseal ovarian axis of female albino rats.	1990-1993	CSIR	3.50	Prof. Gurcharan Kaur
51	Role of opioid peptides in the hypothalamic control of neuroendocrine factors	1989-1992	UGC	1.57	Prof. Gurcharan Kaur

S. No.	Title	Duration	Funding Agency	Amt (Lacs)	PI/ Co-PI
52	Role of Neuropeptides in the control of spontaneous ovulation in rats.	1987-1989	UGC	0.09	Prof. Gurcharan Kaur
Total				1494.7	

Total No. of Ongoing Projects : 09
Total No. of Completed Projects : 43
Total Research Grant received : 1494.7 Lacs

Other Grants Sanctioned to the Department from Different Agencies (2015-2020)

Grants	Total (Rs. in lakhs)
DBT (MSc. Programme)	56.705
UGC (XII Plan)	1.50
DST-FIST	110.00
DST-PURSE	20.05
UPE- CPEPA	6.25
DBT-DISC	26.63
Total	221.135

LIST OF MAJOR EQUIPMENTS

S. No.	Insturments Name	Funding Source	Qty.
1	Centrifuge	DST-FIST	2
2	Nano Drop (ND 200C)	UGC XIth Plan	1
3	Gel Documentation System	DBT Project; DBT-FIST	5
4	Bioanalyzer	DST FIST	1
5	-80 Deep Freezer	DST FIST; DBT Grant	2
6	Real Time PCR	DST FIST; DBT Project	3
7	2D Workstation	DST FIST	1
8	Cell counter	DST-FIST	1
9	HPLC (Semi Prep.)	DST FIST	1
10	HPLC (Analytical)	DBT project	1
11	Inverted Microscopes	DBT Project	3
12	Gene Pulser Electrophoresis	DBT Project	1
13	FPLC	DST-PURSE	1
14	Protein Purification System	DBT Project	1
15	Pathology Workstation	DBT Project	1
16	Trinocular Fluorescent Microscope	DBT Project	1
17	Ice Matic (II)	XIth Plan	1
18	Spectrophotometer	DST FIST; DST PURSE; DBT Project	3

HIGH IMPACT FACTOR PUBLICATIONS FROM THE DEPARTMENT

S. No.	Journal	Impact factor
1	Trends in Biotechnology	13.58
2	Biotechnology Advances (2)	11.45
3	Current Opinion in Plant Biology	7.35
4	Acta Crystallographica (Biological Crystallography)	7.23
6	Chem Commun (4)	6.29
7	Plant Physiology	5.95
8	Journal of Materials Chemistry	5.92
9	Bioresource Technology	5.81
10	Journal of Experimental Botany	5.35
11	Scientific Reports (3)	4.12
12	J Neuroinflammation (2)	5.19
13	Mol. Neurobiol. (3)	5.08
14	Food Chemistry	4.94
15	J Neurochem. (2)	4.61
16	Ann. N.Y. Acad.Sci.	4.22
17	BMC Plant Biology (2)	3.93
18	Frontiers in Plant Science (3)	3.68

TOTAL PUBLICATIONS : 113

Cumulative Impact Factor : **400.53**

Average Impact Factor : **3.55**

INCENTIVE AWARDS RECEIVED BY THE DEPARTMENT



**Publication in high repute journals
2014**



**Publication in high repute journals
2015**

INCENTIVE AWARDS RECEIVED BY THE DEPARTMENT



Best Paper Award 2015



**Publication in high repute journals
2015**

भारतीय राष्ट्रीय विज्ञान अकादमी

Indian National Science Academy



FOUNDED IN 1935

INSA Teachers Award
for the Year ..2012.....

to

.....*Pratap Kumar Pati*.....

...*Guru Nanak Dev University, Amritsar*...

at the Anniversary General Meeting

on ..29 December 2012....


VICE PRESIDENT


PRESIDENT

INSA Teacher's Award 2012.

RESEARCH COLLABORATIONS

International

- AIST, Tsukuba, Japan
- INSERM, Lille, France
- CIRAD, Montpellier, France
- University of Hamburg, Germany
- University of North Carolina , USA
- University of Kentucky, USA
- Georgetown University, USA
- Queens University, Kingston, Canada
- Chungbuk National University, South Korea

National

- IIT, Madras
- IHBT-CSIR, Palampur
- University of Delhi, South Campus, New Delhi
- JNU, New Delhi
- IMTECH, Chandigarh
- ICGEB, New Delhi
- CCMB, Hyderabad
- Panjab University, Chandigarh
- IIIM, Jammu
- IIT, Mumbai
- NII, New Delhi

Intra-University

- Department of Chemistry
- Department of Food Science and Technology
- Department of Human Genetics
- Department of Botanical and Environmental Sciences
- Department of Molecular Biology & Biochemistry
- Department of Microbiology
- Department of Zoology



ACADEMIC INITIATIVES

DIALAB International Online Lecture Series



**DBT - AIST International Laboratory
for Advanced Biomedicine**

DAILAB

**Classroom for Advanced & Frontier Education
CAFE**

Coordinator:- Prof.(Dr.) Pratap Kumar Pati

Total Participating Laboratories world wide:- 6 (Japan, China, Sri Lanka, Indonesia, South Korea and India)

Participating Indian laboratories:- 3 (IIT-Delhi, Manipal University and Guru Nanak Dev University)

Till now more than 25 lectures have been conducted



Departmental Students Visited DIALAB Centre at AIST, Tsukuba, Japan



Varinder Singh
2015



Manish Dhawan
2016



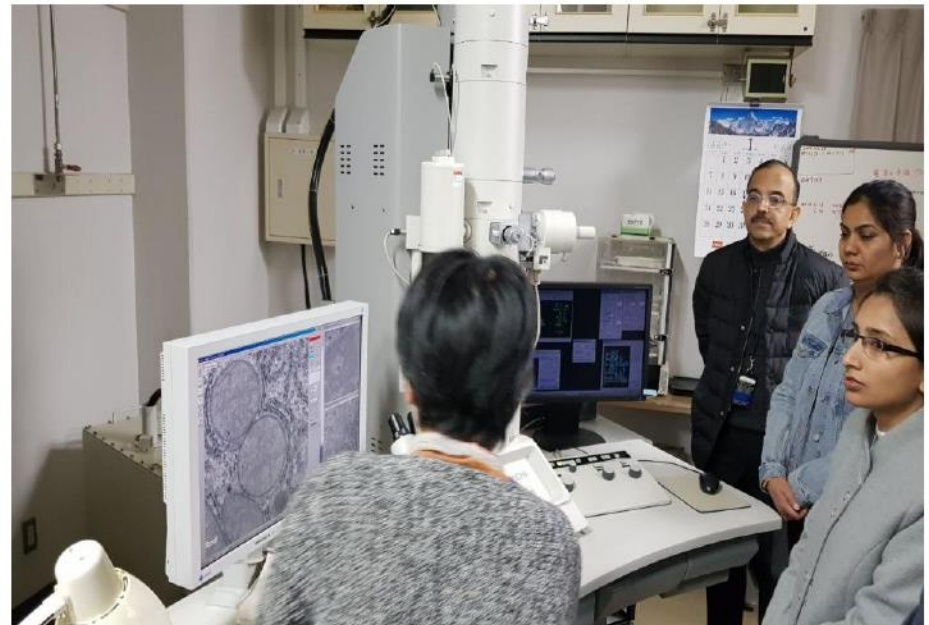
Dr. Kulwinder Kaur
2017



Baldev Singh
2018



Anuradha Sharma
2018



Global Initiative of Academic Networks (GIAN)



Cell Engineering for Biomedicine- Basics to Application

Feb. 6-10, 2017

Foreign Faculty: Dr. Renu Wadhwa

National Institute of Advanced Industrial Science & Technology (AIST), Japan

Course Coordinator: Prof. (Dr.) Gurcharan Kaur

Total Number Participants Registered :- 60



Post-transcriptional Control of Gene Expression in Eukaryotes

Feb. 20-25, 2017

Foreign Faculty: Prof. (Dr.) Arthur G Hunt

Department of Plant and Soil sciences, University of Kentucky, USA

Course Coordinator: Prof. (Dr.) Pratap Kumar Pati

Total Number Participants Registered :- 152



Molecular Gerontology : from Homeodynamics to Hormesis

October 8-18, 2018

Foreign Faculty: Dr. S.I.S. Rattan, Laboratory of Cellular Ageing (LCA)

Department of Molecular Biology and Genetics, Aarhus University, Denmark

Course Coordinator: Prof. (Dr.) Gurcharan Kaur

Total Number Participants Registered :- 50

Fulbright Specialist Program

Emerging Concepts and Experimental Approaches in Biomedical Research



Course Faculty:

Dr. Amrita Cheema

Professor,
Department of Oncology and
Biochemistry,
Georgetown University Medical Center,
Washington DC, USA

Course Coordinator: Dr. Pratap Kumar Pati

Number of Participants:- 110



Visiting Faculty Lecture

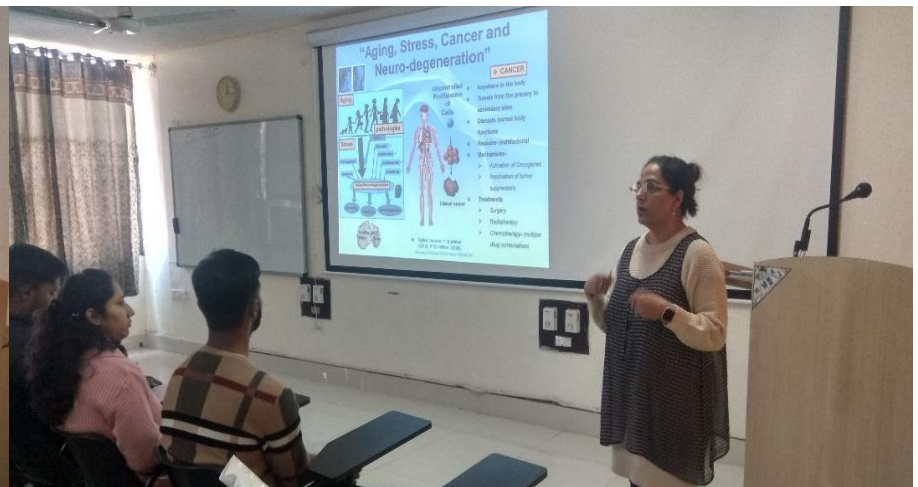
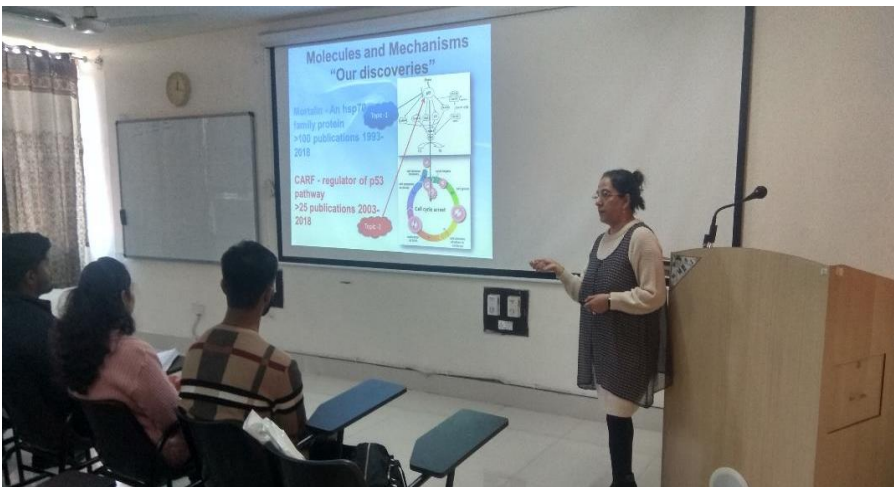
Honey Bee Propolis for Aging and Cancer Interventions: Basic Biology and Mechanisms



Dr. Renu Wadhwa

Prime Senior
Researcher
and
Head DAILAB,
BMRI

National Institute of Advanced
Industrial Science and Technology
(AIST), Japan



RECOGNITION TO FACULTY

- Fulbright-Nehru Senior Research fellowship
- INSA Teacher's Award
- DBT-CREST Awards (2)
- BOYSCAST Fellowship of Department of Science and Technology (DST), Govt. of India
- Fellow, Indian Academy of Neurosciences
- Indian Winner of Biotechnology Young Entrepreneurship Scheme (YES) of Department of Biotechnology, Government of India.
- Members of mentoring committee for Star College Program, DBT, New Delhi.
- Member of Task Force for DBT-JRF Program
- Member of Task Force for DBT-Star college Program
- In recognition of their expertise, various faculty members are nominated to academic bodies of different Universities/Institutes.

Distinguished Alumni of the Department



Dr. Rupinder Kaur

**Staff Scientist,
CDFD, Hyderabad**



Dr. Archana Chugh

**Associate Professor,
Kusuma School of
Biological Sciences,
IIT, Delhi**



Dr. P.K. Singh

**Senior Scientist, CSIR,
NBRI, Lucknow**



Dr. Subhadeep Chatterjee

**Head, Laboratory
of Plant-Microbe
Interactions,
CCMB, Hyderabad**



Dr. Sanjiv Kumar

**Associate Professor,
Department of Biological
Sciences, BITS Pilani,
Rajasthan**



Dr. Gopaljee Jha

**Scientist,
NIPGR, New Delhi**