

**ADVANCED LEVEL INSTITUTIONAL BIOTECH HUB,
HANDIQUE GIRLS' COLLEGE, GUWAHATI**

- 1. Name & Address of the Institution:** Handique Girls' College, Guwahati-781001, Assam
- 2. Chairman:** Dr Ranjit Sarma, Principal, Handique Girls' College.
- 3. Name of the Coordinator:** Dr. Uday Sankar Senapati, Assistant Professor, Department of Physics.
- 4. Level of the Biotech Hub:** Advanced Level Institutional Biotech Hub
- 5. Date & Year of the sanction of biotech hub with DBT's Sanction Order No:** BT/04/NE/2009 dated 21.09.2010

STAFF:



Name: Nisha Seth

Designation: Junior Research Fellow

Qualification: M.Sc. (Microbiology)



Name: Rusmita Buragohain

Designation: Laboratory Assistant

Qualification: M.Sc. (Microbiology)

A brief on Biotech Hub:

The Institutional Biotech Hub of Handique Girls' College was established in 2011 and was among the first batch of Biotech Hubs sanctioned by the DBT, Government of India. The sanction of the Hub was greeted with lot of enthusiasm by the entire college. It was the able leadership of former Principal of the college Dr Indira Bardoloi who granted all administrative support and Dr Utpal Dutta, then senior faculty of zoology and present Principal of the college, whose tireless effort has made it possible to establish such a national standard biotech laboratory in the college. Within the limited space of the college, Dr. Dutta could set up a laboratory with international standard instruments to work on genomics, proteomics, and immunology. Since then, the Hub has become an integral part of science learning and research in the College and has fostered interdisciplinary. The Hub has been instrumental in providing students with an exposure to modern tools and techniques of biology and today students of the college, not only read about PCR, ELISA and other such tools in the textbooks but are able to benefit from a practical exposure. Students both at undergraduate and postgraduate level could learn biology through research base learning and has become able to expose themselves with molecular biology techniques of tissue protein extraction, DNA isolation, DNA amplification through the PCR, PAGE, Agarose gel electrophoresis and Gel analysis. This has made biology learning more attractive and has also engendered interdisciplinary, with Departments of Chemistry and Physics coming forward to carry out joint projects with the Life Sciences, using Hub resources. The Hub infrastructure has supported the College in opening one of the first undergraduate study programs in Microbiology under the Gauhati University, and also postgraduate programs in Botany, Chemistry and Zoology. The Hub is supporting faculty research, undergraduate projects and M.Sc. Dissertation work. There are also Ph.D. scholars who use the facilities. Furthermore, the Hub facilities are made available, on request, to users from neighboring institutes which enhances inter-institutional co-operation.

Completed project:

Title of the project: Establishment of Institutional Biotech Hubs (IBT Hubs)

Sanctioned project cost: 75.41 lacs

Duration: 8 years

Funding agency: Department of Biotechnology, Govt. of India

Date of commencement of project: 21/09/2010

Date of completion of project: 19/06/2019

Principal Investigator: Principal, Handique Girls' College

Ongoing project:

Title of the project: DBT-NER Advanced level Institutional Biotech Hub at Handique Girls' College, Guwahati focusing on Targeting bacterial biofilms with polyphenol-loaded and silver-doped zinc oxide nanoparticles: prospects for agro- horticultural application (Phase-II).

Sanctioned project cost: 57.76 Lacs

Duration: 3 years

Funding agency: Department of Biotechnology, Govt. of India

Date of commencement of project: 21/02/2023

Principal Investigator: Dr. Uday Sankar Senapati, Assistant Professor (Stage-III), Department of Physics, Handique Girls' College.

FACILITIES: (List of Equipments procured under the Biotech Hub since its inception):

Sl. No.	Name of the equipment	Model No. & Brand Name	No. of researchers/ students utilized these Equipments
1	Gradient Thermal Cycler	MyCycler, BioRad	86
2	Horizontal Electrophoresis	Mini Sub Gel GT, BioRad	111
3	Vertical Electrophoresis	Mini-Protean Tetra Cell, BioRad	70
4	Gel Doc System	EZ System, BioRad	239
5	Long-wave UV Penlight	BioRad	78
6	1 KVa UPS	Better Power	239
7	Microplate Reader	iMark, BioRad	28
8	Refrigerated Centrifuge	5424 R, Eppendorf	135
9	Autopipettes (set of 4)	Research plus™, Eppendorf	239
10	PCR Coolers (set of 2)	Eppendorf	86
11	Autopipette (100 - 1000µl)	Tarsons (T-1000)	228
12	Horizontal Laminar Flow Hood	Neofam Instruments, NED Ultra Nlenz TM	185
13	Upright Freezer (-20°C)	Celfrost	196
14	Refrigerator (260l)	LG Electronics (GL-275VTG5)	260
15	Microwave Oven	-do-(MS2029 UW)	249
16	Autoclave	Yorco (YSI-401)	193

17	Water Bath	-do-(YSI-413)	169
18	Hot Air Oven	-do- (YSI-431)	165
19	Incubator	-do-(YS-438)	157
20	pH Meter	Systronics	134
21	Mini Centrifuge	REMI, RM-02	112
22	Tissue Homogenizer	REMI, RD-127A/D	57
23	Magnetic Stirrer and Hotplate	REMI, Cat No. 1 MLH	135
24	Digital Balance	Kern 572-30	323
25	Multifunction Printer	hp 2050	385
26	UPS 10KVa	10 KVa HR+	217
27	UPS 15 KVa	15 KVa UPS	217
27	Cryocan	BA-03 (3.90 L)	82
28	Autopipettes T1000	Tarsons Cat no : 30061	227
29	Autopipettes T200	Tarsons Cat no : 30051	227
30	Autopipettes T20	Tarsons Cat no : 30021	227
31	Autopipettes T10	Tarsons Cat no : 30011	227
32	Refrigerator	277L, (Model no 28H3000SE Samsung)	347
33	02 nos. Horizontal electrophoresis	Genei Cat no : 106470GB	36
34	02 nos. Vertical electrophoresis	Genei Cat no : 106680GB	40
35	02 nos. Power supply	Genei Cat no: 106854 GB	76
36	Cryocan	BA-03 (11.60 L)	30

37	Distillation unit	Frill, PDU-310360, Bioera	54
38	Autoclave	G7431PAD, 63L, Equitron	47
39	Upright Freezer (- 20)	BSF-345S, Vestfrost	76
40	Dancing Shaker	8479, Tarsons	6
41	Nanodrop Spectrophotometer	Nanodrop 1C, Thermo Scientific	43
42	T100 Thermal Cycler	BioRad	22
43	Mini Dry Bath	G – Biosciences	08
44	CDC Biofilm Reactor	Biosurface Technologies Corp	3
45	Peristaltic Pump for Biofilm Reactor	Ostech Fluid	3
46	Micropipette Set	TARSONS	4
47	Magnetic Stirrer with Hot plate	Remi	5
48	Single-cell Gel Electrophoresis tank, chiller and powerpack	ALMICRO	2
49	Table top Centrifuge Machine	ALMICRO	4



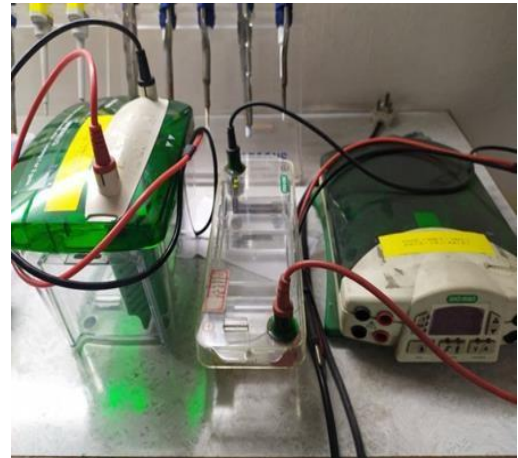
Nanodrop Spectrophotometer



Gradient Thermal Cycler



Gel Doc system



Vertical and Horizontal Electrophoresis



Table Top Centrifuge machine



Magnetic Stirrer

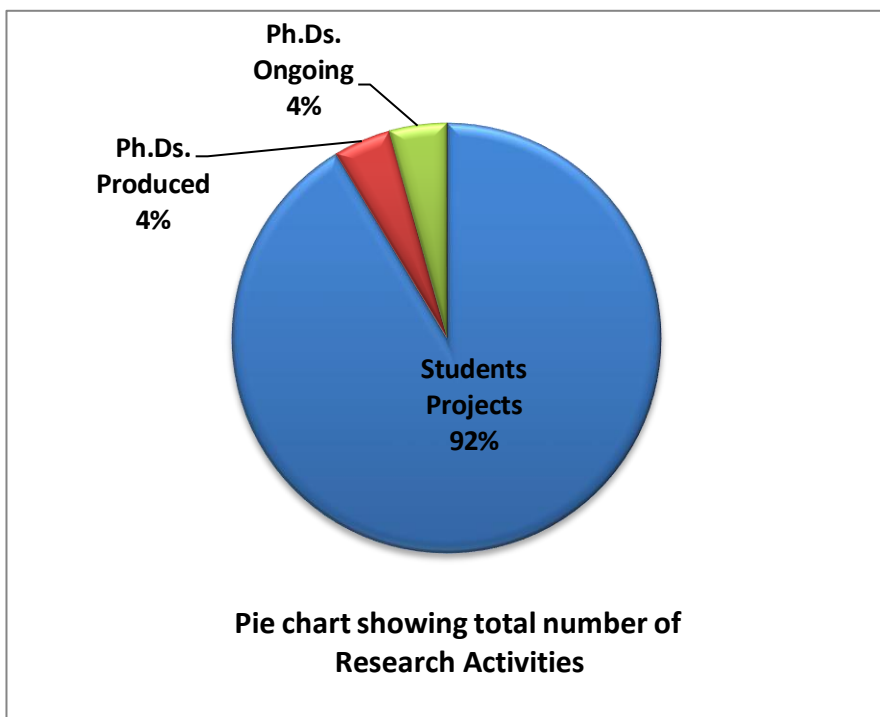


Single cell gel electrophoresis

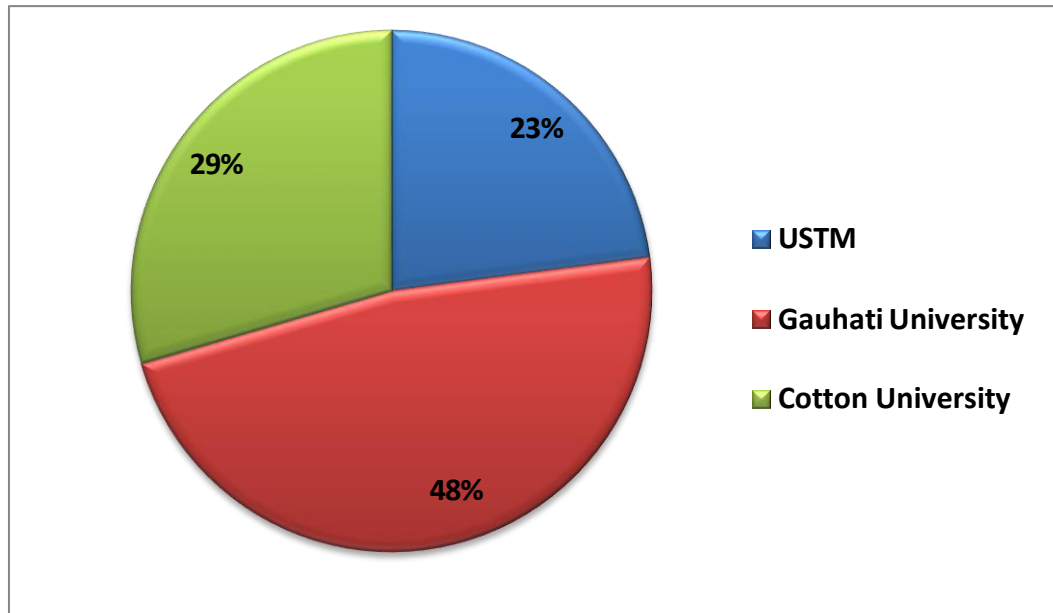
RESEARCH ACTIVITIES

PhD awarded utilizing the Hub infrastructure:

- i. Dr. Innifa Hasan, Assistant Professor, Department of Zoology: 2010-16; Thesis title: Assessment of genetic diversity of certain species of *Mystus scopoli* (Pisces: Bagridae) in Assam.
- ii. Dr. Merina Das, Don Bosco School, Guwahati; 2010-16. Thesis title: Genetic diversity Assessment of certain species of Belontiidae fish family of Assam, India.
- iii. Dr. Uday S. Senapati, Assistant Professor, Department of Physics: 2010-16; Thesis title: Synthesis and characterization of ZnS nanoparticles prepared by green chemical routes.
- iv. Dr. Bhavna P. Baishya, Assistant Professor, Department of Zoology, Assam Don Bosco University: 2011-2015; Thesis title: Studies on certain aspects of innate immunity, both cellular and humoral of Muga Silkworm, *Antheraea assama* Westwood.



BENEFICIARY OUTSIDE INSTITUTIONS



Major areas of work done by the beneficiaries-

- DNA Isolation
- PCR
- Gel Electrophoresis
- Antimicrobial Assay

PUBLICATIONS:

Details of papers published (directly from the Hub) in peer reviewed journals, citing bibliographic references.

- Hasan I and Goswami MM. Genetic variation among cat fish (*Mystus cavasius*) population assessed by randomly amplified polymorphic (RAPD) markers from Assam, India. *International Journal of Fisheries and Aquatic Studies*. ISSN: 2347-5129 (2015); 2 (4) : XX – XX.
- Innifa Hasan and Mrigendra Mohan Goswami. Genetic variation among cat fish (*Mystus carcio*) population assessed by randomly amplified polymorphic (RAPD) markers from Assam,

India. *International Journal of Fisheries and Aquaculture Sciences*. ISSN: 2248 – 9975; Volume 5, Number 1 (2015), pp 31 – 41.

- Senapati US, Jha DK, Sarkar D. Green Synthesis and Characterization of ZnS nanoparticles. *Res J Physical Sci* 1(7): 1 – 6 (2013).
- Senapati US and Sarkar D. Characterization of biosynthesized zinc sulphide nanoparticles using edible mushroom *Pleurotus ostreatus*. *Indian J Phys* 88 (6): 557-562 (2014).
- Senapati US, Jha DK and Sarkar D. Structural, Optical, thermal and Electrical properties of Fungus guided biosynthesized Zinc Sulphide Nanoparticles. *Research Journal of Chemical Sciences* ISSN 2231 – 606X Volume 5 (1), 33-40 (2015).
- Senapati US and Sarkar D. Synthesis and characterization of biopolymer protected zinc sulphide nanoparticles; *Superlattice and Microstructures* 85 (2015): 722 – 733.
- Uday Sankar Senapati, Raktima Kalita, Jyotsna Gayan, Runmi Athparia. Green synthesis of CDS nanoparticles using edible oyster mushroom extract and study of their structural, optical and antibacterial properties, *International Journal of Basic and Applied Research*; 9(2):324-331.
- Aswathy Ravindran, Jyotsna Gayan, Bandana Nabis Das. A standardized protocol for genomic DNA isolation from the species of *Plumbago Linn*. *International Journal of Life Sciences Scientific Research*. 3(5): 1345-1349.
- Ananya Phukan, Jyotsna Gayan, Aswathy Ravindran, Bandana Nabis, A standardized protocol for the genomic DNA isolation from the leaf of *Camellia sinensis* (Linn.) O. Kuntze, *Journal of Food, Agriculture and Environment*, Issue 3&4 (2016).

Hands on trainings/workshops conducted:

Sl. No.	Title	Duration and Dates	No. of Participants	Level of Participants (Ph.D./PG/UG)
1.	Workshop on Basic Techniques in Molecular Biology	2 days (6 th -7 th Jan 2012)	11	Faculty
2.	Workshop on Basic Biotechnological Tools and Applications	2 days (11 th -12 th Jan 2012)	10	Faculty
3.	Workshop on ELISA techniques	1 day (6 th July 2012)	12	Faculty
4.	Workshop on Plasmid DNA cloning	1 day (22 nd Dec 2012)	15	
5.	Workshop on Basic Microbiological techniques	3 days (18 th -20 th Sept 2013)	17	UG
6.	Workshop on Basic Microbiological techniques	3 days (24 th -26 th Sept 2013)	16	UG
7.	Workshop on Laboratory Methods in Bacteriology	3 days (5 th -7 th May 2014)	16	UG
8.	Workshop on Plasmid and genomic DNA extraction its amplification and SDS – PAGE	7 days (28 th Oct-12 th Nov 2014)	13	UG
9.	Workshop on DNA extraction, electrophoresis, DNA sizing and Bio-informatics	3 days (2 nd -4 th Apr 2015)	12	PG
10.	Workshop on Plant Molecular Biology Techniques	3 days (20 th -22 nd Feb 2015)	19	UG
11.	Plant genomic DNA isolation and quantification	(22 nd Sept-7 th Oct 2015)	08	PG
12.	Workshop on Electrophoretic analysis of proteins by SDS PAGE	7 days (2 nd - 9 th Feb 2016)	12	PG
13.	DNA Barcoding in fish using COI	3 days (15 th -17 th Mar 2016)	10	PG
14.	Protein isolation from insect and mammalian tissue and SDS PAGE electrophoresis	2 days (30 th Apr-1 st May 2016)	24	UG and PG
15.	Isolation, quantitation, separation and molecular	10 days (21 st -30 th Sept 2016)	08	PG

	weight determination of proteins from plants			
16.	The Polymerase chain reaction	2 days (26 th -27 th Oct 2016)	14	UG
17.	Singleplex and Multiplex PCR: Principles and Applications	5 days (2 nd – 6 th Jan 2018)	12	UG & PG
18.	Fish Immunology Techniques	1 day (4 th Mar 2018)	09	UG & PG
19.	DNA Barcoding in Species Identification	5 days (6 th -10 th Mar 2018)	16	PG
20.	Basic Molecular Biology Techniques	6 days (18 th -23 rd Jun 2018)	12	UG
21.	Basics of Bioinformatics	6 days (24 th -29 th Sept 2018)	22	PG
22.	Reverse Transcription and Real-time PCR	2 days (5 th -6 th Oct 2018)	8	PG
23.	Basic Molecular Biology Techniques	6 days (17 th -22 nd Jun 2019)	11	UG
24.	Bioinformatics	6 days (9 th -14 th August)	30	UG and PG
25.	Electrophoretic analysis of proteins and DNA	5 days (4 th -8 th Dec 2023)	22	Faculty
26.	Synthesis of nanoparticles and their application	5 days (26 th -30 th Dec)	30	PG
27.	Evaluation and Analyzing Bacterial Biofilms	6 days (4 th -9 th Nov, 2024)	27	UG and PG
28.	Modern PCR Techniques: Applications and Innovations in Biology	5 days (19 th -23 rd Nov, 2024)	20	Faculty
29.	DNA Barcoding	2 days (21 st -22 nd Feb 2025)	25	UG, PG and Ph.D scholars
30.	Application of Nanomaterials in Life Science	3 days (24 th -26 th Sept, 2025)	21	UG and PG



Workshop on “Advances in Omics Technologies-Role of Bioinformatics”, 2018



Workshop on “DNA Barcoding in Species Identification”, 2018



Workshop on “Bioinformatics”, 2023



Workshop on “Electrophoretic analysis of proteins and DNA”, 2023



Workshop on “Evaluation and Analyzing Bacterial Biofilms”, 2024



Workshop on “Modern PCR Techniques: Applications and Innovations in Biology”



Workshop on “DNA Barcoding”, 2025



Workshop on “Applications of Nanomaterials in Life Science”, 2025

Outreach programs conducted for neighboring schools or institutions:

Sl. No.	Topic	Target participants (Host Institution / other Institution)	Duration and Dates	No. of participants	Level of participants (Ph.D./PG /UG)
1.	Introduction to the Microbial World	Sankardev Vidya Niketan, Darrangari, Goalpara	1 day, 25th Feb 2015	45	VIII-X standard students
2.	Biotechnology and our day to day life	Panbazar Girls' H.S School, Guwahati	1 day, 27th Nov, 2015	65	VIII-XI standard students
3.	Lecture on "Cell cycle & its regulation, Genetic Engineering in Agriculture" & Practical demonstration on "Mitotic & meiotic chromosome preparation"	Panitema Satgaon H.S School, Panitema, Kamrup	1 day, 30th Apr 2016	96	IX and X standard students
4.	Bad Microbes	Cotton Collegiate Govt. Boys H.S. School, Guwahati	1 day, 8th Apr 2017		IX, X, XI and XII standard students
5.	Health and Hygiene	Daimugiri LP School, Daimugiri, Fatasil Ambari, Guwahati-781025	2 days, 23 rd -24 th Mar 2018	21	IV and V standard students
6.	Hand washing, Health and Hygiene	Kamakhya H.S School	1 day, 1st Oct 2018	105	I-VIII standard students
7.	Balanced Diet and Nutrition	Daimugiri LP School, Daimugiri, Fatasil Ambari, Guwahati-781025	1 day, 9th Nov 2018	40	I-V standard students
8.	Entrepreneurship development program on food processing	Satargaon, Rani Kamrup, Assam	1 day, 27 th Sept 2023	24	UG and PG
9.	Entrepreneurship development program on food processing	Bahupara, Puranbari, Kamrup, Assam	1 day, 28 th Sept 2023	24	UG and PG

10.	Entrepreneurship Development Program on Extraction and Use of Natural Dyes in Dyeing and Painting of Fabrics	Daimugiri LP School, Fatasil Ambari, Daimugiri, Kanak Lata Path, Guwahati-781025	1 day, 22 nd March, 2025	35	Self-help group members
-----	--	--	-------------------------------------	----	-------------------------



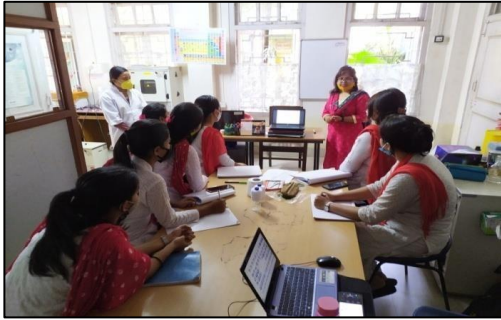
Outreach

programme on “Food processing” at Satargaon and Bahupara, Kamrup, Assam, 2023



Outreach programme on “Extraction and use of natural dyes in dyeing and painting of Fabrics” at Fatasil Ambari, Daimugiri, Kanak Lata Path, Guwahati, Assam, 2025

Hands-on Trainings conducted:



Presentation on Plant Molecular Biology Techniques, 2021



Demonstration of UV-vis Spectrophotometer, 2021



Hands on training on SDS PAGE, 2021



Amplification of target sequence by PCR, 2021



Hands on training on preparation of media plates, 2025



Hands on training on spread plate method, 2025