

## INSTITUTES AND CONSTITUENT COLLEGES

### INSTITUTE OF SELF ORGANISING SYSTEMS AND BIOPHYSICS

The Institute was established in 1986. It is a research institute within the University systems dedicated to undertake interdisciplinary research activities in newly emerging and unconventional areas. The primary aim of the Institute has been to investigate biological phenomena using techniques of physical sciences and to train students to face challenges encountered in pushing the frontiers of science. The Institute is dependent upon the students from various departments for its research programmes leading to Ph.D. and M.Phil. degrees of the University. The faculty members are encouraged to pursue diverse research activities with the hope that proximity and interaction should help to evolve programmes of an interdisciplinary nature. The core faculty members of different background and training collaborate and interact with academic persons of other departments like Mathematics, Physics, Biochemistry, RSIC, Computer Centre, Economics, and with national institutions outside Shillong. The current activities of the Institute include measurements of biophotonic activity and its possible connection with squeezed states, hormonotoxin and drug targeting, characterising the inherent biological oscillators in the rhythmic activities, acoustic communication in frogs, biodiversity and conservation of amphibians for the entire Eastern Himalayan belt, spectroscopic determination of the structure of proteins and crystals, simulation of carcinogenesis and its probable mechanism, modelling of neuronal and immunological activities and chaos.

**Head :** Professor R.P. Bajpai (In charge)

**Faculty :**

**Professor :** Dr. R.P. Bajpai, M.Sc. (Alig)., Ph.D. (Glas).

**Readers :** Dr. Vinod Singh, M.Sc./Ph.D. (Kanpur)  
 Dr. Satish Kumar, M.Sc. (Ban.), Ph.D. (Utkal)  
 Dr. Debjani Roy, M.Sc. (Gau.), Ph.D. (NEHU)

**Student Intake :**

- (a) Enrolment capacity : Ph.D. 4  
 (b) Actual Admission : 3

SC/ST	Genl	Male	Female	Total
0	3	3	0	3

**Degrees Awarded :**

M.Phil.

- Amarendra Sarma "Effects of altitudinal gradients on morphological characters and call patterns of Anurans from North East India". Supervisor Dr. Debjani Roy.

Ph.D.

1. James Haorah "Mechanistic models for carcinogenic activity potency index, and choice of target organ for carcinogenesis by N-Nitroso compounds". Supervisor Dr. R.H.Duncan Lyngdoh.
2. Jayati Sengupta "Theoretical Investigations on the role of modified DNA for carcinogenesis by polycyclic aromatic amines". Supervisor Dr. R.H.Duncan Lyngdoh.
3. Paul Sansan Dkhar "Spectroscopic Study of the trace elements on rice (*Oryza sativa*. Linn) in Meghalaya". Supervisor Dr. P. Nongkynrih.
4. Vijay Kumar Sharma "Behavioural expressions of biological clocks: A biophysical study". Supervisor Dr. P.Nongkynrih.

**Funds received from agencies other than NEHU/UGC :**

Department of Science and Technology, New Delhi, "Timing of development of the middle ear in *Rana limnocharis* and acoustically mediated behaviour from metamorphosis to sexual maturity" Dr. Debjani Roy. Rs. 8.00 Lakhs.

Department of Science and Technology, New Delhi, "Origin, Characteristics, and applications of Ultraweak photon emission", Professor R.P.Bajpai. Rs. 3.88 Lakhs.

**Courses conducted :** (for M.Phil and Ph.D degrees) :

Methods of Science, Self Organising System, Living State and Biophysics of Living Organisms, and Applied Computer Science.

**Seminars/Conferences :**

*Attended :*

Debjani Roy (i) attended the XXV International Ethological Conference at Vienna, Austria in August 1997 and presented a paper titled "Acoustic communication in amphibians of northeast India". Debjani Roy delivered two lectures on "Overview of lower animal (amphibia) behavioural studies and social structure" at the Department of Zoology and at the Centre for Ornithology and Wildlife Studies at Aligarh Muslim University in December 1997.

R.P.Bajpai attended the International Conference on Biophotons in July 1997 at the International Institute of Biophysics, Neuss, Germany and delivered an invited talk on "Coherent Nature of Biophotons: experimental evidence and Phenomenological model".

Satish Kumar attended the discussion meeting on "Structures, dynamics and functions of Complex system" at Indian Institute of Sciences, Bangalore in June 1997 and presented two papers entitled "Non exponential decay of photon signal from time dependent squeezed state" (by R.P.Bajpai and S.Kumar). "A model of population dynamics for biological system" (by S.Kumar and S.K.Srivatava).

Vinod Singh attended the 41st German Endocrine Society meeting, Lubec, Germany, 1997 and presented a paper titled "In-vivo reduction/re-oxidation studies of hCG-subunit" (Vinod Singh and Wolfgang E. Merz).

### Publications

Bajpai, R.P., Kumar, S. and Sivadasan, V.A. "Frequency-stable damped oscillator model of Biophoton Emission" *Frontier Perspective* 6:9-16 (1997).

Pal, B., Bajpai, P.K., Sengupta, J., and Singh, V. "Vibrational studies on the heterobifunctional cross-linking agents N-succinimidyl. 3-(2-Pyridyldithio) propionate and N-succinimidyl 1-6[3-(2-pyridyldithio) propionate] hexanoate and theoretical elucidation" *J. Raman Spectroscopy*, 28:232-239, (1997).

Roy, D. "Communication signals and sexual selection in amphibians" *Current Science*. 72:923-927 (1997).

Merz, W.E., Singh, V. "In-vivo reduction/re-oxidation studies of hCG-subunit" *Exp. Clin. Endocrinol. & Diabetes*, 105:79, (1997).

**Study Tour/Field Trips of students :** Bijoylakshmi Borah made a trip for a month to the Centre for Ecological Studies, IISc, Bangalore.

### Thrust Areas :

Biophotonic Emission, Squeezed States, Immunology, Neuroethology, Developmental Physiology and Biodiversity Conservation.

### Research Projects :

1. DST SERC project "Timing of development of the middle ear in *Rana Limnocharis* and acoustically mediated behaviour from metamorphosis to sexual maturity" started from February 1997 and continuing for 3 years. (Dr. Debjani Roy as principal investigator)

2. WWF-India project "Prioritisation of biodiversity rich sites in the 3 north eastern states : Meghalaya, Mizoram and Nagaland". Dr. Debjani Roy as principal investigator (in collaboration with Sri Aurobindo Institute of Indian Culture, Shillong).

3. DST project "Origin, Characteristics, and applications of Ultraweak photon emission" (Professor R.P. Bajpai and Dr. Satish Kumar).

### Other Activities :

Debjani Roy was invited to attend (1) the discussion meeting on Project LIFESCAPE at the Centre for Ecological Studies, IISc., Bangalore in July 1997, and (2) the mid year and annual meeting of the Indian Academy of Sciences held at Bangalore and at Hyderabad in July and November respectively as a member of the Academy's Educational Panel. She has also been appointed member of the Organizing Committee for the forthcoming XXVI International Ethological Conference to be held at Bangalore in August 1999. Her work on acoustic communication and social structure received a coverage in *The Times of India* dated

24.12.1997.

Dr.S.Kumar taught the course Quantum Mechanics-I to M.Sc.(Physics) in Department of Physics from September 22 to November 22, 1997.

**PACHHUNGA UNIVERSITY COLLEGE**

Pachhunga University College was founded in 1958 and is now 39 years old. The College was initially a private college and in 1967 was made a government college under the composite state of Assam. It remained a government college till 1979, when it was upgraded to a constituent college of North-Eastern Hill University, Shillong, with a view to make it a pace-setting institution in the region.

This is a premier college in Mizoram with qualified faculty members, and offers undergraduate courses in eighteen subjects of Sciences, Arts and Commerce including "Honours". It has a library with a collection of 32,082 books and 81 journals, and a teaching faculty of 90 teachers, and an annual enrolment of 1200 students.

Sl. No.	Hostel Name	Year	Genl.	SC / ST	Total
1.	Petara Hostel (Women)	1997-98	48	10	58
2.	Senatar Hostel (Women)	1997-98	48	5	53
3.	Saramat Hostel (Men)	1997-98	48	4	52
4.	Japu Hostel (Men)	1997-98	90	18	108
5.	Sonpetnung Hostel (Research Scholar) (Men)	1997-98	48	8	56
6.	Chinlung Hostel (Research Scholar) (Men)	1997-98	48	15	63
7.	Balgito Hostel (Research Scholar) (Women)	1997-98	30	3	33

The Office also coordinated the study tours of seven academic departments.

Name of Department	Place of Visit
1. Chemistry	Delhi - Mumbai
2. Botany	Bangalore - Mumbai
3. Physics	Bangalore - Mysore
	Mumbai - Goa