

HOMI BHABHA NATIONAL INSTITUTE



ANNUAL REPORT 2007-2008



Reg. Off. : Knowledge Management Group
Bhabha Atomic Research Centre
Central Complex, Mumbai - 400 085.

HOMI BHABHA NATIONAL INSTITUTE

ANNUAL REPORT 2007-2008



Knowledge Management Group,
Bhabha Atomic Research Centre,
Central Complex, Mumbai-400 085.

1. Constituent Institutions (CIs) of HBNI

1. BHABHA ATOMIC RESEARCH CENTRE (BARC), MUMBAI
2. INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH (IGCAR) , KALPAKKAM
3. RAJA RAMANNA CENTRE FOR ADVANCED TECHNOLOGY (RRCAT), INDORE
4. VARIABLE ENERGY CYCLOTRON CENTRE (VECC), KOLKATA
5. SAHA INSTITUTE OF NUCLEAR PHYSICS (SINP), KOLKATA
6. INSTITUTE FOR PLASMA RESEARCH (IPR), GANDHINAGAR
7. INSTITUTE OF PHYSICS (IoP), BHUBANESWAR
8. HARISH-CHANDRA RESEARCH INSTITUTE (HRI), ALLAHABAD
9. TATA MEMORIAL CENTRE (TMC), MUMBAI
10. INSTITUTE OF MATHEMATICAL SCIENCES (IMSc.), CHENNAI

2. From the Director

It gives me great pleasure to write for the third annual report of the Institute. I am happy to report that the first two Ph.D. theses have been completed and many more are in the pipe line. Number of students enrolled in the Institute is now 1016 and the stage has been set for beginning MD/MS programmes at Tata Memorial Hospital.

I am also happy to report that all efforts are being made to ensure that there is transparency in the system of evaluation of research theses and reports. For this purpose it has been decided that signatures of all examiners, internal as well as external, will be on an evaluation sheet which will form a part of every bound thesis. We expect that strong research faculty and a transparent evaluation system will ensure the quality of Ph.D. theses coming from the Institute and quality Ph.Ds. are the need of the hour to spur innovation in the country. We have to remember that for the size of India's population, number of Ph.Ds. produced, particularly in engineering is abysmally low and for the good of our country more and more quality Ph.Ds. are desirable.

Students who completed course work as part of the M.Tech. programme at BARC Training School are now working for their project and some of them will be completing their project within a few months.

Our Institute has 10 different Constituent Institutions (CIs) and this provides the Institute with great strength as each of the CIs has a long and illustrious history. Our Institute has to combine the strengths of all CIs in a manner such that the combined strength is more than what one can get based on simple arithmetic. A very high priority accorded to experimental work is one of many strong features of CIs the CIs have a wide variety of experimental facilities and they also have the expertise to design experiments. Facilities available span a wide range: from table top experimental set ups to mega facilities and all these provide unique opportunities to research scholars. While in this report, we are reporting about completion of two theses, we hope to reach a three digit number very soon.



(R B Grover)

3. Annual Report 2007-2008

Composition of various bodies

HBNI functioned as per the decisions taken by various bodies of the Institute. The Composition of various bodies is given in the Annexure-1. It also lists officers of the Institute.

Commencement of Academic Activities

The academic programmes at the CIs of HBNI were conducted as per schedule. The Annexure-2 lists the Standing Committees whereas the status of admissions during the year in various programmes in each CI is placed at Annexure-3. The list of faculty is placed at Annexure-4.

Since its academic programmes were launched in the academic year beginning 2006, the first results of HBNI were declared in 2007. The results declared were for Diploma in Medical Radio-Isotope Techniques (DMRIT) and for the Post Graduate Diploma (PGDip) programme at the BARC Training Schools.

Prior to the commencement of academic programmes of HBNI, there were students pursuing PhD in various CIs, most of whom were registered with one or the other university. However, there were some students who had not yet registered with any university at the time and were interested in registering with HBNI. The Academic Council formulated guidelines for enrolling such students in HBNI. The guidelines were essentially to ensure that the criteria adopted by HBNI for admitting PhD students were met even by those who were admitted to the CIs prior to the formation of HBNI and intended to enroll in HBNI. Two such students in IoP completed their PhD and were declared eligible for the award of the degree. The abstracts of their theses is placed at Annexure-5. In addition, DMRIT results were also declared in which six students were declared successful.

The Diploma in Radiological Physics (DipRP), conducted at BARC, was brought under the ambit of HBNI.

The approval of Medical Council of India was obtained to transfer to HBNI the Post graduate medical programmes at Tata Memorial Centre from Maharashtra University of Health Sciences, Nashik.

A memorandum of understanding was signed with the Institute of Chemical Technology, Mumbai for academic collaboration. A copy the MoU is placed at Annexure-6.

Summarized next are the decisions taken in the meetings of Council of Management and the Academic Council during the period of the report.

- A. Following meetings of Council of Management (CoM) were held during the period:
1. Fourth meeting on August 24, 2007 in South Block, New Delhi
- B. Following meetings of Academic Council (AC) were held during the period:
1. Sixth meeting on April 7, 2007.
 2. Seventh meeting on November 17, 2007.

Important decisions taken in these meetings are summarized below.

A. Important decisions taken in the meetings of the CoM

1. The Rules were amended to specify Secretary, Department of Higher Education, Ministry of Human Resource Development, Govt. of India as an ex-officio member of the CoM.
2. Constitution of Board of Studies in Health Sciences by the Academic Council was approved.
3. The decision of the Academic Council to permit academic activities at NISER, which was set up as part of IoP, under the aegis of HBNI from the academic year (September 2007-08) was approved.
4. The format of Mark Sheet (Statement of Marks) and Provisional Certificate for the students of DMRIT programme were ratified.
5. The decision of the Standing Committee of the CoM to co-host the Conference on Structural Mechanics in Reactor Technology (SMiRT) to be held in 2011 in India was ratified.
6. The Notification issued with respect to Visiting Professorship Scheme of HBNI was ratified.
7. The Notification pertaining to External Registration Programme of HBNI was ratified.

B. Important decisions taken in the meetings of the Academic Council

Sixth meeting: April 7, 2007

1. The Post graduate diploma programme in Radiological Physics (DipRP) conducted in BARC was recognized for the award of Diploma by HBNI.
2. The Visiting Fellowship Scheme drafted by the Dean on the advise of the Council of Management was approved.
3. It was decided that Raja Ramanna Fellows working in CIs can be Faculty provided they satisfy criteria to be faculty or have been faculty prior to their superannuation.
4. In principle, approval was accorded to institute an external registration programme for employees of units of DAE which are not CIs of HBNI, and AERB. It asked the Dean to notify 'Detailed Procedure' for the external registration programme.
5. The requests from the CIs to allow the students admitted to their PhD programmes prior to formation of HBNI and who were close to finishing PhD work to submit thesis before completing two years of enrolment in HBNI was considered. The guidelines for granting waiver of two-years residency requirement for the students in question were formulated.

6. The integrated B.Sc.-M.Sc. programme at the National Institute of Science Education and Research (NISER), a part of Institute of Physics, was recognized for the award of HBNI degree.
7. The norms were laid down for inclusion for award of research based degree of HBNI for the research work done prior to registration/enrolment in HBNI.

Seventh meeting: November 17, 2007

1. A new Board of Studies named the Board of Health Sciences was constituted.
2. The Rules regarding number of members of Boards of Studies to be retired every year were revised.
3. Setting up of university cell in every Constituent Institution was suggested.
4. A policy was formulated with respect to the number of subjects in which failure is permitted to continue course work in the next trimester/semester and also for the number of attempts permitted.
5. It was decided that the HBNI faculty/M.Tech Guides be asked periodically about their individual contribution towards Human Resource Development activities of DAE in an approved format. It was decided that the report be sought every two years and that the First report be obtained by August 1, 2008.
6. A policy was formulated with regard to allowing students with basic degree in one discipline to register for PhD degree in another discipline. It also formulated similar policy with regard to guides.
7. Guidelines were formulated with respect to conduct of screening examination for Non Training School Employees of DAE for admission in Ph.D./M.Sc.(Engg.) programmes of HBNI.

- 4. Receipts & Payments for the financial year ending on 31.3.2008 are given in Annexure 7.**

Annexure - 1

Composition of the Bodies of the Institute

Council of Management

Dr. Anil Kakodkar Chairman, AEC	Chairman	
Shri R.C.Joshi Member Finance, AEC	Member	From 5.6.2007
Shri R. P. Agrawal Secretary Higher Education, MHRDD	Member	From 31.10.2006
Prof. Arun Nigavekar Raja Ramanna Fellow & Trustee & Senior Advisor, Science & Technology Park, University of Pune	Member	
Prof. Vinod K. Gaur India Institute of Astrophysics Bangalore	Member	From 3.1.2007
Dr. Baldev Raj Director, IGCAR	Member	
Dr. S. Banerjee Director, BARC	Member	
Dr. K.A. Dinshaw Director, TMC	Member	
Dr. R.B. Grover Director, HBNI	Member	
Dr. Bikash Sinha Director, SINP	Member	
Dr. R.R. Puri Dean, HBNI	Member-Secretary	

Academic Council

Prof. R.B. Grover	Chairman
Prof. S.K. Apte	Convener, Board of Studies in Life Sciences
Prof. D. Balasubramanian	Director, Eye Research Foundation, Hyderabad
Prof. R. Balasubramanian	Director, IMSc

Prof. Baldev Raj	Director, IGCAR
Prof. S. Banerjee	Director, BARC
Prof. K.A. Dinshaw	Director, TMC
Prof. B.K. Dutta	Convener, Board of Studies in Engineering Sciences
Prof. Dipan Ghosh	IIT-Bombay
Prof. P.K. Kaw	Director, IPR
Prof. E.D. Jemmis	IISc, Bangalore
Prof. V. Venugopal	Convener, Board of Studies in Chemical Sciences
Prof. Gangan Prathap	CSIR Centre for Mathematical Modeling and Computer Simulation, Bangalore.
Dr. K.L. Ramakumar	Convener, Board of Strategic Studies
Prof. A. Raychaudhuri	Director, HRI
Prof. V.C. Sahni	Director, RRCAT
Prof. Abhijit Sen	Convener, Board of Studies in Physical Sciences
Prof. Bikash Sinha	Director, SINP and Director, VECC
Prof. V.S. Sunder	Convener, Board of Studies in Mathematical Sciences
Prof. Y.P. Viyogi	Director, IoP
Prof. R.R. Puri	Member - Secretary

Advisory Committee

Dr. Anil Kakodkar Chairman, AEC	Chairman
Prof. R. Balasubramanian Director, IMSc	Member
Dr. Baldev Raj Director, IGCAR	Member
Dr. S. Banerjee Director, BARC	Member

Prof. S. Bhattacharya Director, TIFR	Member	Upto 31.10.2007
Prof. Y.P. Viyogi (from April 2006) Director, IoP	Member	
Dr. K.A. Dinshaw Director, TMC	Member	
Dr. R.B. Grover Director, HBNI	Member	
Prof. P.K. Kaw Director, IPR	Member	
Prof. A. Raychaudhuri Director, HRI	Member	
Dr. V.C. Sahni Director, RRCAT	Member	
Dr. Bikash Sinha Director, VECC and Director, SINP	Member	
Dr. R.R. Puri Dean, HBNI	Member-Secretary	
Dr. C.V. Anandabose	Invitee (Till January 2008)	

Board of Studies of HBNI

Physical Sciences

- | | |
|----------------------------------------|---------------------|
| 1. Prof. Abhijit Sen (IPR) | Convener |
| 2. Prof. V.M. Datar (BARC) | |
| 3. Prof. C.S. Sunder (IGCAR) | |
| 4. Prof. Dinesh Srivastava (VECC) | |
| 5. Prof. Avinash Khare (IOP) | |
| 6. Prof. P.D. Gupta (RRCAT) | |
| 7. Prof. A. Raychaudhuri (HRI) | |
| 8. Prof. Kamles Kar (SINP) | |
| 9. Prof. Gautam Menon (IMSc) | |
| 10. Prof. Srinivas Ramakrishnan (TIFR) | Since January, 2008 |

Chemical Sciences

- | | |
|---------------------------------|----------------------|
| 1. Dr. V. Venugopal (BARC) | Convener |
| 2. Dr. J.V. Yakhmi (BARC) | |
| 3. Dr. V.K. Manchanda (BARC) | |
| 4. Dr. Swapan Ghosh (BARC) | |
| 5. Dr. K.S. Viswanathan (IGCAR) | |
| 6. Dr. T. Gnanasekaran (IGCAR) | |
| 7. Dr. V.K Jain (BARC) | |
| 8. Prof. P.N.Bajaj (BARC) | Since January, 2008. |

Life Sciences

- | | |
|---------------------------------|--------------------|
| 1. Dr. S.K. Apte (BARC) | Convener |
| 2. Dr. (Mrs.) S.M. Zingde (TMC) | |
| 3. Dr. S.F. D'Souza (BARC) | |
| 4. Prof. J.K. Dattagupta (SINP) | |
| 5. Prof. Rita Mulherkar (TMC)) | |
| 6. Prof. M.Seshadri (BARC)) | |
| 7. Prof. A.K.Sharma (BARC)) | From January, 2008 |
| 8. Prof. B.J.Rao (TIFR)) | |

Engineering Sciences

- | | |
|----------------------------------|--------------------|
| 1. Prof. B.K. Dutta(BARC) | Convener |
| 2. Dr. S.B. Koganti (IGCAR) | |
| 3. Dr. P.K. Vijayan (BARC) | From January, 2008 |
| 4. Dr. D. Sathiyamoorthy (BARC) | |
| 5. Dr. A.P. Tiwari (BARC) | |
| 6. Dr. A. K. Suri (BARC) | |
| 7. Dr. Kamachi Mudali (IGCAR) | |
| 8. Dr. M.S. Bhatia (BARC) | |
| 9. Dr. P.V. Varde (BARC) | |
| 10. Dr. Debranjank Sarkar (VECC) | |

Mathematical Sciences

- | | |
|--------------------------------------|--------------------|
| 1. Prof. V.S. Sunder (IMSc) | Convener |
| 2. Prof. S. Kesavan (IMSc) | |
| 3. Prof. S.D. Adhikari (HRI) | |
| 4. Dr. R.R. Puri (BARC) | |
| 5. Prof. R. Ramanujam (IMSc) | |
| 6. Dr. N. Raghwendra (HRI) | |
| 7. Prof. R.C.Cowsik (MU)) | |
| 8. Prof. Murali Srinivasan (IIT-B)) | From January, 2008 |
| 9. Prof. Madhav Mukund (CMI)) | |

Strategic Studies

- | | |
|-----------------------------------------------------------------------|----------|
| 1. Dr. K.L. Ramakumar (BARC) | Convener |
| 2. Dr. A.K. Kohli (BRIT) | |
| 3. Dr. Subhash Chandra (DAE) | |
| 4. Dr. B.B. Singh (ex-BARC and Scientific Advisor, High Court Mumbai) | |
| 5. Prof. Rangan Banerjee (IIT-Bombay) | |

Board of Health Sciences (Constituted in January, 2008)

1. Prof. K.Mohandas (TMC)
2. Prof. K.B.Sainis (BARC)
3. Dr. Rajiv Sarin (TMC)
4. Dr. S.K.Srivastava (TMC)
5. Dr. R.A.Badwe (TMC)
6. Dr. P.M.Parikh (TMC)
7. Dr. N. Jambekar (TMC)
8. Prof. Shobha Bhatia (KEM)

9. Prof. Avinash Supe (KEM)
10. Dr. M.G.R.Rajan (BARC) since March 2008

Officers of the Institute

Academic

Prof. R.B. Grover	Director
Prof. R.R. Puri	Dean
Dr. Avichal Kapoor	Assistant Dean

Administrative and Accounts

Dr. G.D. Pungle	Finance Officer
Shri D. Ramesh	Administrative officer
Shri Mahabir Singh	Accounts Officer

Deans-Academic at the CIs

BARC

Prof. S.K. Apte - Life Sciences
Prof. B.K. Dutta - Engineering Sciences
Prof. V.M. Datar - Physical Science
Prof. Swapan Ghosh - Chemical Sciences

IGCAR

Prof. K.S. Viswanathan

RRCAT

Dr. S.C. Mehendale

VECC

Dr. P. Barat

SINP

Prof. Parthasarathi Majumdar

IPR

Prof. Abhijit Sen

IoP

Prof. Avinash Khare

TMC

Dr. K.M. Mohandas

IMSc

Prof. S. Kesavan - Mathematical Sciences
Prof. R. Jaganathan - Physical Sciences

HRI

Prof. Biswarup Mukhopadhyaya

Annexure - 2

Standing Committees

BARC Standing Committees

Physical Sciences and Mathematical Sciences

1.	Dr. J.V. Yakhmi	Chairman
2.	Dr. S. Kailas	Member
3.	Dr. R.K. Choudhury	Member
4.	Dr. S.L. Chaplot	Member
5.	Dr. B.N. Jagtap	Member
6.	Dr. S.M. Sharma	Member
7.	Dr. (Ms.) L.J. Dhareshwar	Member
8.	Dr. K.C. Mittal	Member
9.	Dr. S.C. Sabharwal	Member
10.	Dr. R. Srivenkatesan	Member
11.	Dr. D.N. Sharma	Member
12.	Dr. D.P. Chakravarthy	Member
13.	Dr. S.V.G. Menon	Member
14.	Dr. V.M. Datar	Convener

Chemical Sciences

1.	Dr. V. Venugopal	Chairman
2.	Dr. T. Mukherjee	Member
3.	Dr. S.K. Kulshreshtha	Member
4.	Dr. B. Venkatramani	Member
5.	Dr. S.K. Sarkar	Member
6.	Dr. S.V. Narasimhan	Member
7.	Dr. J. Arunachalam	Member
8.	Dr. (Ms.) Meera Venkatesh	Member
9.	Dr. V.K. Manchanda	Member
10.	Dr. K.L. Ramakumar	Member
11.	Dr. S.K. Aggarwal	Member
12.	Dr. S. Sabharwal	Member
13.	Dr. S.K. Ghosh	Convener

Life Sciences

1.	Dr. K.B. Sainis	Chairman
2.	Dr. S.F. D'Souza	Member
3.	Dr. M. Seshadri	Member
4.	Dr. A.K. Sharma	Member
5.	Dr. M.G.R. Rajan	Member
6.	Dr. M.V. Hosur	Member
7.	Dr. S.K. Apte	Convener

Engineering Sciences & Strategic Studies

1.	Dr. A.K. Suri	Chairman
2.	Dr. L.M. Gantayet	Member

3.	Dr. R.K. Singh	Member
4.	Dr. P.K. Vijayan	Member
5.	Dr. A.P. Tiwari	Member
6.	Dr. M.S. Bhatia	Member
7.	Dr. P. Varde	Member
8.	Dr. D. Sathiyamoorthy	Member
9.	Dr. V.K. Suri	Member
10.	Dr. B.K. Dutta	Convener

RRCAT Standing Committee

1.	Dr. P.D. Gupta	Chairman
2.	Shri S. Kotaiah	Member
3.	Dr. P.K. Gupta	Member
4.	Dr. A.K. Nath	Member
5.	Dr. L.M. Kukreja	Member
6.	Shri C.P. Navathe	Member
7.	Dr. G.S. Lodha	Member
8.	Dr. S.B. Roy	Member
9.	Dr. S.C. Mehendale	Convener

IGCAR Standing Committees

Physical Sciences

1.	Dr. C.S. Sundar	Chairman
2.	Dr. R. Indira	Member
3.	Dr. P. Mohanakrishnan	Member
4.	Dr. A.K. Arora	Member
5.	Dr. K.G.M. Nair	Member
6.	Dr. A.K. Tyagi	Member
7.	Dr. P.V. Sivaprasad	Member
8.	Dr. N. Subramanian	Member
9.	Dr. H.K. Saha	Member
10.	Dr. M. Sai Baba	Member
11.	Dr. K.S. Viswanathan	Member
12.	Dr. G. Amarendra	Convener

Chemical Sciences

1.	Dr. T. Gnanasekaran	Chairman
2.	Dr. T.G. Srinivasan	Member
3.	Dr. S.B. Koganti	Member
4.	Dr. V. Ganesan	Member
5.	Dr. K. Nagarajan	Member
6.	Dr. U. Kamachi Mudali	Member
7.	Dr. S. Anthonysamy	Member
8.	Dr. K.V.G. Kutty	Member
9.	Dr. A. Bharathi	Member
10.	Dr. M. Sai Baba	Member
11.	Dr. K.S. Viswanathan	Convener

Engineering Sciences

1. Dr. T. Jayakumar Chairman
2. Dr. P. Chellapandi Member
3. Dr. S.B. Koganti Member
4. Dr. A.K. Bhaduri Member
5. Dr. P.V. Sivaprasad Member
6. Dr. U. Kamachi Mudali Member
7. Dr. C. Anand Babu Member
8. Dr. K. Velusami Member
9. Dr. B.P.C. Rao Member
10. Dr. B.K. Panigrahi Member
11. Dr. K.S. Viswanathan Member
12. Dr. M. Sai Baba Convener

VECC Standing Committee

1. Dr. R.K. Bhandari (Director, VECC) Chairman
2. Dr. D.K. Srivastava
3. Dr. S. Pal
4. Shri Subimal Saha
5. Shri Jayanta Chaudhuri
6. Dr. D Sarkar (Convener, Engineering Sciences)
7. Dr. Alok Chakraborty
8. Dr. S. Bhattacharya
9. Dr. S. R. Banerjee
10. Dr. P. Barat (Convener, Physical Sciences)
11. Dr. V.S. Pandit
12. Dr. Jane Alam
13. Dr. (Smt.) Paramita Mukherjee

Annexure - 3

Admission Statistics

HOMI BHABHA NATIONAL INSTITUTE

Admissions: 2007-08

S. No.	Programme	BARC	IGCAR	RRCAT	VECC	SINP	IPR	IOP	HRI	TMC	IMSc	TOTAL
1	PGD*	232	45	14	0	0	0	0	0	0	0	291
2	PGDRM	8	0	0	0	0	0	0	0	0	0	8
3	PGDMRIT	9	0	0	0	0	0	0	0	0	0	9
4	DipRP	30	0	0	0	0	0	0	0	0	0	30
5	M. Sc. (Engg.)	9	6	0	0	0	0	0	0	0	0	15
6	M. Tech.#	72	22	0	0	0	0	0	0	0	0	94
7	Ph. D. (Engg.)	33	15	4	0	0	0	0	0	0	0	52
8	Ph. D. (Phys.)	32	24	16	10	16	21	0	2	0	2	123
9	Ph. D. (Chem.)	6	19	0	0	0	0	0	0	0	0	25
10	Ph. D. (Life)	6	0	0	0	1	0	0	0	10	0	17
11	Ph. D. (Math.)	0	0	0	0	0	0	0	2	0	6	8
12	Ph. D. (Hlth.)	0	0	0	0	0	0	0	0	0	0	0
13	Ph. D. (Stra.)	0	1	0	0	0	0	0	0	0	0	1
14	I. PhD (Phys.)	0	0	0	0	0	0	0	1	0	5	6
15	I. PhD (Math.)	0	0	0	0	0	0	0	0	0	2	2
16	M. Ch.	0	0	0	0	0	0	0	0	0	0	0
17	M. D.	0	0	0	0	0	0	0	0	0	0	0
18	D. M.	0	0	0	0	0	0	0	0	0	0	0
19	D. A.	0	0	0	0	0	0	0	0	0	0	0
Total		437	132	34	10	17	21	0	5	10	15	681

Total-PhD No.: 234

Actual Admission No.: 681-MTech No.= 681-94= 587

PGD: Post Graduate Diploma in Nuclear Science and Engineering

DRM: Diploma in Radiation Medicine

DMRIT: Diploma in Medical Radio Isotope Techniques

Dip. R. P.: Diploma in Radiological Physics

M. Tech: Master of Technology

M. Phil: Master of Philosophy

M. Sc. (Engg.): Master of Science (Engineering)

Ph. D.: Engineering, Physics, Chemistry, Life, Mathematics, Health and Strategic Studies

IPhD: Integrated Ph. D.

M. Ch.: Surgical Oncology

MD: Pathology, Radiotherapy, Anaesthesia

DM: Medical Oncology

DA: Diploma in Anaesthesia

* No. under BARC includes Students from BARC Training Schools at Hyderabad, Tarapur, Rawatbhata, Kaiga, Kalpakkam and Kudankulam

Refers to Students who have upgraded enrolment from PGD to M. Tech. subsequent to successfully completing course work for PGD

Annexure - 4

Faculty List 2007 (Up to March 2008)

BARC***Chemical Sciences***

1. Achutan P.V.
2. Agarwal S.K.
3. Arunachalam J.
4. Bajaj P.N.
5. Banerjee (Ms.) S.
6. Bharadwaj (Ms.) S.R.
7. Chattopadhyay A.
8. Chattopadhyay S.
9. Chaurasia S.C.
10. Das D.
11. Dash S.
12. Deo M.N.
13. Ghosh S.K.
14. Ghosh Swapan
15. Goswami A.
16. Jaikumar Sunil
17. Jain V.K.
18. Jha S.K.
19. Kalsi P.C.
20. Kapoor Sudhir
21. Kayasth S.R.
22. Krishnamurthy N.
23. Kshirsagar R.J.
24. Kulshreshtha S.K.
25. Manchanda V.K.
26. Meera Venkatesh (Ms.)
27. Mohapatra P.K.
28. Mukherjee S.K.
29. Mukherjee T.
30. Naik D.B.
31. Naik P.D.
32. Narasimhan S.V.
33. Natrajan V.
34. Nayak S.K.
35. Padmanabhan P.V.A.
36. Pal H.D.
37. Palit D.K.
38. Pandit Gouri G.
39. Parathasarthy V.
40. Pillai C.G.S.
41. Priyadarshini (Ms.) K.I.
42. Pujari P.K.
43. Ramakumar K.L.
44. Rangarajan S.
45. Reddy A.V.R.
46. Sabharwal Sunil
47. Samanta S.K.
48. Sarkar S.K.
49. Tomar B.S.
50. Tripathi R.M.
51. Tyagi A.K.
52. Varshney Lalit
53. Vatsa R.K.
54. Velmurugan S.
55. Venkataramani B.
56. Venkateswaran G.
57. Venugopal V.
58. Yakhmi J.V.

Engineering Sciences

1. Awasthi A.
2. Badodkar D.N.
3. Balasubramaniam R.
4. Banerjee S.
5. Bhatia M.S.
6. Bidaye A.C.
7. Chakraborty S.P.
8. Chattopadhyay J.

9. Chkaravarthy J.K.
10. Das R.
11. Dey G.K.
12. Dutta B.K.
13. Gantayet L.M.
14. Ghosh A.K.
15. Gopika Vinod
16. Grover R.B.
17. Hubli R.C.
18. Kain V.
19. Kale G.B.
20. Kapoor Rajiv
21. Kar D.C.
22. Khan K.B.
23. Krishnan J.
24. Kulkarni U.D.
25. Kutty T.R.G.
26. Madan V.K.
27. Maheswari N.K.
28. Nagesh K.V.
29. Nayak A.K.
30. Pande D.P.
31. Patankar V.H.
32. Prasad G.J.
33. Ramanathan S.
34. Rami Reddy G.
35. Ravindranath S.V.G.
36. Sathiyamoorthy D.
37. Sengupta A.K.
38. Singh R.K.
39. Suri A.K.
40. Suri V.K.
41. Taliyan S.S.
42. Tewari P.K.
43. Tiwari A.P.
44. Topkar Amita V.

45. Vaidya P.P.
46. Varde P.V.
47. Vijayan P.K.
48. Vinod Kumar A.

Life Sciences

1. Apte S.K.
2. Bandekar J.R.
3. Bhagwat S.G.
4. Chaubey R.C.
5. D'Souza S.F.
6. Devasagayam T.P.A.
7. Dongre T.K.
8. Fulzele D.P.
9. Ganapathi T.R.
10. Gopalakrishna T.
11. Grace Samuel
12. Hosur M.V.
13. Indira Priyadarshini (Ms.)
14. Jambhulkar S.J.
15. Jawali Narendra
16. Kale S.P.
17. Kamat J.P.
18. Lebana J. Joseph (Ms.)
19. Malini (Ms.) Krishna
20. Melo J.S.
21. Meera Venkatesh
22. Minal Mhatre (Ms.)
23. Misra Hari S.
24. Mukherjee P.K.
25. Narkar Archana
26. Poduval T.B.
27. Rao T.S.
28. Rajan M.G.R.
29. Roja Gopalakrishnan (Ms.)

30. Sainis (Ms.) J.K.
31. Sainis K.B.
32. Seshadri M.
33. Sharma A.K.
34. Susan (Ms.) Eapen
35. Suprasanna P.
36. Venugopalan V.P.
37. Vinay Kumar
38. Warriar Prasad

Physical Sciences

1. Amitabh Das
2. Aswal D.K.
3. Aswal V.K.
4. Basu S.
5. Bhanumurthy K.
6. Bhattacharyya D.
7. Biswas D.
8. Biswas D.C.
9. Biswas D.J.
10. Chaplot S.L.
11. Choudhury N.
12. Choudhury R.K.
13. Chougankar M.P.
14. Das A.K.
15. Dasgupta K
16. Deb S.K.
17. Debnath A.K.
18. Deo M.N.
19. Degweker S.B.
20. Dhreshwar L.
21. Gadkari S.C.
22. Gaitonde D.M.
23. Ganesan S.
24. Godbole S.V.

25. Godwal B.K.
26. Gupta S.K.
27. Gupta N.K.
28. Jagtap B.N.
29. Jain S.R.
30. John B.V.
31. Kailas S
32. Kher R.K.
33. Kothiyal G.P.
34. Kshirsagar R.J.
35. Kulkarni U.D.
36. Mayya Y.S.
37. Mazumdar S.
38. Mehboob S.A.H.
39. Mishra A.P.
40. Mohanty A.K.
41. Mukherjee G.D.
42. Mukhopadhyay R.
43. Nakhate S.G.
44. Panakkal J.P.
45. Pant L.M.
46. Puri R.R.
47. Raju V.S.
48. Rao P.M.
49. Rao T.V.C.
50. Sahoo N.K.
51. Sakuntala T
52. Sangeeta
53. Sarkar P.K.
54. Sastry U
55. Satyaranjan Santra
56. Saxena Alok
57. Sharma S.M.
58. Shrivastava Aradhana
59. Shukla P
60. Sinha Amar

61. Sinha S (Ms.)
62. Srivastava G.K.
63. Sundararaman M.
64. Singh Pitamber
65. Thakur K.B.
66. Vijaikumar V
67. Vinay Kumar
68. Wagh A.G.
69. Yusuf S.M.

Strategic Studies

1. Grover R.B.
2. Ramakumar K.L.

HRI

Physical Sciences

1. Bagla J.S.
2. Choubey (Ms.) Sandhya
3. Das Tapas Kumar
4. Datta A.
5. David Justin R.
6. Gandhi Raj
7. Ghoshal Debashis
8. Gopakumar Rajesh
9. Gopalakrishnan Manoj
10. Goswami S.
11. Jatkar Dileep P.
12. Majumdar Pinaki
13. Mukhopadhyaya B.
14. Naik S.
15. Panda Sudhakar
16. Pareek T.P.
17. Rao (Ms.) Sumathi

18. Ravindran V.
19. Raychaudhuri Amitava
20. Sen Ashoke
21. Sen Prasenjit
22. Sriramkumar L.

Mathematical Sciences

1. Adhikari Sukumar Das
2. Batra Punita
3. Chakraborty Kalyan
4. Dalawat Chandan Singh
5. Dey Rukmini
6. Raghavendra N.
7. Ramakrishnan B.
8. Ratnakumar P.K.
9. Surya Ramana D.
10. Thangadurai R.

IGCAR

Chemical Sciences

1. Anthonysamy S.
2. Gnanasekaran T.
3. Kamachi Mudali (Ms.) U.
4. Mallika(Ms.) C.
5. Nagrajan K.
6. Panigrahi B.S.
7. Sai Baba M.
8. Srinivasan T.G.
9. Vasudeo Rao P.R.
10. Viswanathan K.S.
11. Viswanathan R.

Engineering Sciences

1. Anand Babu C.
2. Baldev Raj
3. Bhaduri A.K.
4. Chellapandi P.
5. Jayakumar T.
6. Kamachi Mudali
7. Purna Chandra Rao B.
8. Sivaprasad P.V.
9. Velusamy K.
10. Venugopal S.

Physical Sciences

1. Amarendra G.
2. Arora A.K.
3. Bharathi A.
4. Chandra Shekar N.V.
5. Dash S.
6. Indira (Ms.) R.
7. John Philip
8. Keshavamurthy R.S.
9. Mathi Jaya S.
10. Mohanakrishnan P.
11. Mohankumar N.
12. Murthy K.P.N.
13. Nair Muraleedharan K.G.
14. Panigrahi B.K.
15. Raghavan G.
16. Ravindran T.R.
17. Reddy C.P.
18. Sahu Ch. P.
19. Sahu H.K.
20. Sankar P.
21. Subramanian N.

22. Sunder C.S.
23. Tata B.V.R.
24. Tyagi Ashok Kumar
25. Vijayalakshmi M.

IMSc**Mathematical Sciences**

1. Anirban Mukhopadhyay
2. Arvind V
3. Balasubramanian R.
4. Iyer Jaya N
5. Kesavan S
6. Kodiyalam Vijay
7. Krishna M
8. Lodaya Kamal
9. Mahajan Meena B
10. Nagaraj D.S.
11. Paranjape Kapil H
12. Partha Sarathi Chakraborty
13. Pralay Chatterjee
14. Prasad Amritanshu
15. Raghavan K.N.
16. Raman, Venkatesh
17. Ramanujam R
18. Sankaran P.
19. Srinivas K
20. Subramanian C.R
21. Sunder V.S.

Physical Sciences

1. Anishetty R.
2. Baskaran G
3. Basu Rahul

4. Date G
5. Digal Sanatan
6. Govindarajan Thupil R
7. Indumathi D
8. Jagannathan R
9. Jayaraman T
10. Kaul R
11. Menon Gautam I
12. Mishra, Ashok K
13. Murthy M.V.N.
14. Nemani V.S
15. Prashanth Jaikumar R
16. Rajesh Ravindran
17. Rama S.Kalyana
18. Ronojoy Adhikari
19. Ray Purusattam
20. Sathiapalan Balachandran
21. Satyavani Vemparala
22. Shankar R
23. Sharatchandra H.S
24. Sibasish Ghosh
25. Siddharthan Rahul
26. Simon R
27. Sinha Nita
28. Sinha Rahul
29. Sinha Sitabhra
30. Sinha Sudeshna
31. Sujay K.Ashok

IPR

Engineering Sciences

1. Chaturvedi Shashank
2. Pathak Surya Kumar

Physical Sciences

1. Anurag Shyam
2. Bora Dhiraj
3. Chaturvedi Shashank
4. Das (Ms.) Amita
5. Kaw P.K.
6. Mukherjee Subroto
7. Rajaraman Ganesh
8. Raole P.M.
9. Reddy Chenna D.
10. Sen Abhijit

IoP

Physical Sciences

1. Agrawal Pankaj
2. Alok Kumar
3. Bhattacharjee Somendra M.
4. Dev Bhupendra Nath
5. Jayannavar A.M.
6. Khare Avinash
7. Mahapatra Durga Prasad
8. Mukherji Sudipta
9. Patra Suresh Kumar
10. Ravi Prasad G.V.
11. Sahu P.K.
12. Sahu S.N.
13. Satyam Parlapalli V.
14. Sekhar Biju R.
15. Shashi C. Patak
16. Som Tapobrata
17. Srivastava Ajit M.
18. Suresh G. Mishra
19. Tripathy Gautam

20. Varma Shikha

21. Viyogi Y.P.

RRCAT

Chemical Sciences

1. Das K.

Life Sciences

1. Dube Alok

2. Sharma (Ms.) Mrinalini

Physical Sciences

1. Banerjee Arup

2. Chakrabarti (Ms.) Aparna

3. Chattopadhyay M.K.

4. Ganesamoorthy S.

5. Ghosh Harnath

6. Gupta P.K.

7. Gupta, P.D.

8. Gupta S.M.

9. Ingale Alka

10. Joshi Mukesh

11. Krishnagopal S.

12. Kukreja L.M.

13. Lodha G.S.

14. Mehandale S.C.

15. Naik P.A.

16. Nath Ashish K.

17. Oak S.M.

18. Rai V.N.

19. Rawat H.S.

20. Roy S.B.

21. Sahni V.C.

22. Senecha V.K.

23. Shailendra Kumar

24. Tiwari V.S.

Engineering Sciences

1. Chatterjee Sanjil

2. Nath A.K.

SINP

Chemical Sciences

1. Basu Samita

2. Bhattacharya Dhananjay

3. Chakraborti Abhijit

4. Ganguly Bichitra

5. Lahiri Sushanta

6. Nayak (Ms.) Dalia

Engineering Sciences

1. Mukhopadhyay Supratik

Life Sciences

1. Chakrabarti Abhijit

2. Chandana Chakrabarti

3. Bhattacharya Dhananjay

4. Mukhopadhyay Debashis

5. Sampa Biswas

6. Udayaditya Sen

Physical Sciences

1. Agrawal Bijay Kumar
2. Bandyopadhyay Debadés
3. Basu Chinmay
4. Bhattacharjee Pijushpani
5. Bhattacharyya Gautam
6. Chakrabarti Nikhil
7. Chattopadhyay Sukalyan
8. De Asit K.
9. Ganguly Bichitra
10. Ghosh Amit
11. Gupta Sankar Kumar
12. Ghoshal Ambar
13. Harindranath A.
14. Kar Kamles
15. Kundu Anjan
16. Majumdar Debasish
17. Majumdar Harashit
18. Majumdar Nayana
19. Majumdar Parthasarathi
20. Mathews Prakash
21. Menon K.S.R.
22. Mitra Parthasarathi
23. Mustafa M.G.
24. Nambissan P.M.G.
25. Nandy Maitreyee
26. Ranganathan R.
27. Ray Nihar Ranjan
28. Roy Shibaji
29. Samanta Chhanda
30. Singh Harvendra
31. Sinha Bikash

TMC**Chemical Sciences**

1. Pakhale S.S.

Life Sciences

1. Chandan Kumar
2. Chiplunkar (Ms.) S.V.
3. Dalal S.N.
4. Desai (Ms.) Sangeeta B.
5. Deshpande DD
6. Dinshaw K.A.
7. Gude Rajiv
8. Gupta Sanjay
9. Jambhekar N.A.
10. Joshi Narendra N.
11. Kadam (Ms.) P.S. Amare
12. Kalraiya Rajiv D.
13. Kelkar Rohini
14. Mahimkar Manoj B.
15. Maru Girish B.
16. Mohandas K. Mallah
17. Mulherkar (Ms.) Rita
18. Mukhopadhyaya Rabindranath
19. Naik(Ms.) Nishigandha R.
20. Prasanna Venkatraman
21. Rai (Ms.) Rekha
22. Sarin Rajiv
23. Shirsat (Ms.) Neelam V.
24. Teni Tanuja R.
25. Vaidya Milind M.
26. Zingde (Ms.) S.M.

VECC

Chemical Sciences

1. Sen Pintu
2. Sarkar D.

Engineering Sciences

1. Mukherjee Paramita

Physical Sciences

1. Bandyopadhyay S.K.
2. Banerjee S.R.
3. Banerjee G.N.
4. Basu D.N.
5. Bhattacharaya (Ms.) Chandana
6. Bhattacharya S.
7. Chakrabarti Alok
8. Chaudhuri A.K.
9. De Udayan
10. Jan-e Alam
11. Md.Haroon Rashid
12. Mukherjee G.
13. Pal Santanu
14. Pandit Vijay S.
15. Ray Amlan
16. Sarma P.R.
17. Srivastava Dinesh
18. Zubeyer Ahammed

Annexure - 5

Abstracts & of the Theses Awarded PhD Degree

(During April 1, 2007-March 31, 2008)

HOMI BHABHA NATIONAL INSTITUTE

1. Soumen Roy

Enrolment No.	:	PHYS07200604002
Constituent Unit	:	Institute of Physics, Bhubaneswar
Date of Viva Voce	:	10.12.2007
Date of award of Provisional Degree	:	24.01.2008
Title of Thesis	:	Some studies on Disorder and Noise in Statistical Physics

Many real-world (social, information, biological or technological) networks exhibit the "small-world" property. However, the important question, namely, whether these networks are disordered has never received sufficient attention. We study by extensive Monte-Carlo simulations the sample to sample fluctuations in the critical region of quenched Ising model on an ensemble of small-world networks (SWN) and find strong self averaging behaviour, despite the relevance of random bonds at the pure critical point. This is contrary to expectations generated by recent renormalization group results which predict non self averaging behaviour at criticality for relevant randomness. These results show that a replica approach commonly adopted for analytical treatment of SWN (presupposing that SWN are disordered) is not needed and a simple annealed averaging should suffice [1].

Various phenomena involving Brownian motors are associated with a high thermodynamic efficiency of energy transduction. However, conventional ratchet models show sub-percentage efficiency. We study the energetic efficiency of an over damped Brownian particle in a saw tooth potential in the presence of time asymmetric driving in the adiabatic limit. Asymmetry in potential with temporal asymmetry in driving leads to a very high efficiency not found in earlier ratchet models. The origin of this is traced to the suppression of backward current. We find that the thermal fluctuations can optimize the energy transduction, the range of parameters, however, being very small. This ratchet model also displays current reversals on tuning of parameters even in the adiabatic regime. The possible relationships between nature of currents, entropy production and input energy are also addressed [2].

Noise induced transport is always accompanied by a dispersive spread (diffusion) which is intimately related to the question of reliability of transport. A large dispersive spread may completely overshadow the ratcheting effect in a system with finite spatial extensions. Unfortunately, this important aspect has received little attention while studies of other properties on ratchet systems abound. We studied the noise-induced currents and coherence of transport in two different classes of rocking ratchets, In the case of a time asymmetric driving, we find that even in the presence of a spatially symmetric simple sinusoidal potential, highly coherent transport occurs. These ratchet systems exhibit giant coherence of transport in the regime of parameter space where unidirectional currents in the deterministic case are observed. Outside this parameter range, i.e., when current vanishes in the deterministic regime, coherence in transport is very low. The transport coherence decreases as a function of temperature and is a

non-monotonic function of the amplitude of driving. The transport becomes unreliable as we go from the adiabatic to the non-adiabatic domain of operation [3].

The asymmetric simple exclusion process has recently been generalised to include internal states [PRL, 97, 050603 (2006)]. The resulting model is thought to have important applications in the polarizing action of spintronics, mesoscopic systems, transport of molecular motors with internal states, two-lane tra_c and other transport problems. The multicritical point of the system is a function of the injection and withdrawal rates of both the states at the boundaries. It is well known however, that disorder plays an important role in each of these areas mentioned above. In this work, we introduce disorder in the hopping rates of the particle with internal states and study the phase diagram obtained after averaging over many different realisations of the rates. We show that the inclusion of disordered hopping rates in the problem introduces an extra phase and changes the phase diagram significantly. The new multicritical point for equal injection rates of both states is a function of the disorder strength only and is independent of the value of injection and withdrawal rates at the boundaries [4].

- [1] S. Roy and S. M. Bhattacharjee, Is small-world network disordered? *Physics Letters A* 352, 13 (2006).
- [2] R. Krishnan, S. Roy, A. M. Jayannavar, Enhanced Thermodynamic efficiency in time asymmetric ratchets, *J. Stat. Mech.* 04012 (2005).
- [3] S. Roy, D. Dan, A. M. Jayannavar, Giant coherence in driven systems, *J. Stat. Mech.* 09012 (2006).
- [4] S. Roy, Disordered Asymmetric exclusion with internal states (unpublished)

2. Taney Kumar Dey

Enrolment No.	:	PHYS07200604006
Constituent Unit	:	Institute of Physics, Bhubaneswar
Date of Viva Voce	:	17.03.2008
Date of award of Provisional Degree	:	31.03.08
Title of Thesis	:	Phase Transitions in Asymptotically ADS Black Holes and Gauge Theory Duals

The main aim of my thesis work is to understand some generic features of gauge theories at the strong coupling. The study of such theory is difficult as no systematic formulation of strongly coupled gauge theory is known. However using recently conjectured AdS/CFT correspondence, in some cases, it is possible make some progress. According to this correspondence, weakly coupled 5-dimensional theory of gravity is dual to 4-dimensional $N = 4$; $SU(N)$ boundary gauge theory at strong coupling. Thus, to understand features of this gauge theory, one needs to understand properties of certain supergravity backgrounds. This is much easier to deal with as the calculations are mostly classical. Following this route, recently a phenomenologically motivated matrix model has been constructed which belongs to the same universality class of $N = 4$ supersymmetric $SU(N)$ gauge theory on S^3 at the limit of infinite 't Hooft coupling (λ). This model correctly reproduces the qualitative features of the phase structures of the dual theory on the supergravity side expected from AdS/CFT. Though uniqueness of such model is always questionable (except perhaps near the critical points), it is encouraging

to find at least one simple model of strongly coupled gauge theory near criticality. This model is characterized by two parameters a and b which are expected to depend on temperature T and λ . We have analysed their dependence on the temperature for fixed λ [1]. However, to get their behaviour for different values of λ , one has to perturbatively decrease λ . Which implies to increase the gravitation coupling in the bulk. This can be effectively done by adding higher derivative terms. Thus, we study thermodynamics of the bulk theory with higher derivative terms and their corresponding boundary duals [1]. We compute how two parameters of the above model behave as a function of λ at fixed temperature. Furthermore, we notice that in order to reproduce the complete phase diagram of the bulk, we need to introduce a four-parameter model. All these parameters also depend on λ and T . Finally, we study the bulk phases of R-charged black hole in the presence of higher derivative terms [2]. These charges appear due to rotation of internal S^5 . In gauge theory, it corresponds to introducing chemical potential λ . We study how our previous model captures qualitative phase structures of the bulk. Here we study the theory in both canonical and grand canonical ensembles.

- [1] T. K. Dey, S. Mukherji, S. Mukhopadhyay and S. Sarkar, Phase Transitions in Higher Derivative Gravity, JHEP 0704, 014 (2007) [arXiv:hep-th/0609038].
- [2] T. K. Dey, S. Mukherji, S. Mukhopadhyay and S. Sarkar, Phase transitions in higher derivative gravity and gauge theory: R-charged black holes, JHEP 0709, 026 (2007) [arXiv:0706.3996 [hep-th]].

Annexure - 6

**Memorandum of Understanding
With
Institute of Chemical Technology, Mumbai**



**MEMORANDUM OF UNDERSTANDING
BETWEEN
HOMI BHABHA NATIONAL INSTITUTE
AND
INSTITUTE OF CHEMICAL TECHNOLOGY**

1. PREAMBLE

WHEREAS the Institute of Chemical Technology, Mumbai (hereafter referred to as ICT) is a premier educational institution in Chemical Engineering, Chemical Technology, and Pharmacy, and the Homi Bhabha National Institute (hereafter referred to as HBNI). a Deemed to be University, is an institute under the aegis of the Department of Atomic Energy (hereafter referred as DAE), Government of India. For the purpose of academic programmes, the following units of DAE are the Constituent Institutions (CIs) of the HBNI.

1. Bhabha Atomic Research Centre (BARC), Mumbai
2. Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam
3. Raja Ramanna Centre for Advanced Technology (RRCAT), Indore
4. Variable Energy Cyclotron Centre (VECC), Kolkata
5. Saha Institute of Nuclear Physics (SINP), Kolkata
6. Institute of Plasma Research (IPR), Gandhinagar
7. Institute of Physics (IOP), Bhubaneswar
8. Harish-Chandra Research Institute (HRI), Allahabad
9. Tata Memorial Centre (TMC), Mumbai
10. Institute of Mathematical Sciences (IMSc), Chennai

WHEREAS there is a long standing collaboration and cooperation between ICT and some of the CIs of HBNI, through programmes such as collaborative research supported by extra-mural funding through the Board of Research in Nuclear Sciences (BRNS), a body under DAE, or directly through establishment of a Centre for Knowledge Based Engineering for the development of novel technologies of direct interest to the DAE programmes and activities.

WHEREAS the ICT, is well known for academic excellence in Chemical Technology, and has dedicated faculty and a large number of post-graduate and research students engaged in research in frontier areas. And the Institute has strong linkages with Chemical Industry and excellent record of developing and transferring technologies to Industry.

WHEREAS both the Institutes believe that each other' research programmes can be strengthened and improved through sharing of thoughts and resources.

WHEREAS there is a need to recognize the common interests in pursuit of knowledge through doctoral and master's programmes.



WHEREAS there is a possibility that the candidates admitted in some of the CIs of HBNI may study at the ICT and carry out the projects under the joint supervision of the faculty members from the ICT and the scientists and faculty members from the CIs of HBNI.

WHEREAS it will be mutually beneficial to have lectures by the ICT faculty members at the HBNI, and by the HBNI faculty members and scientists at the CIs of HBNI at the ICT.

WHEREAS the HBNI and ICT desire to cooperate in their academic programmes in the disciplines of common interest to benefit mutually in the manner described above.

NOW, THEREFORE, the HBNI and the ICT, collectively referred to as 'Partner Institutes', hereby agree to create a long-term institutional partnership in education and research, in the areas of mutual interest, according to the broad framework set forth in this Memorandum of Understanding (Mou).

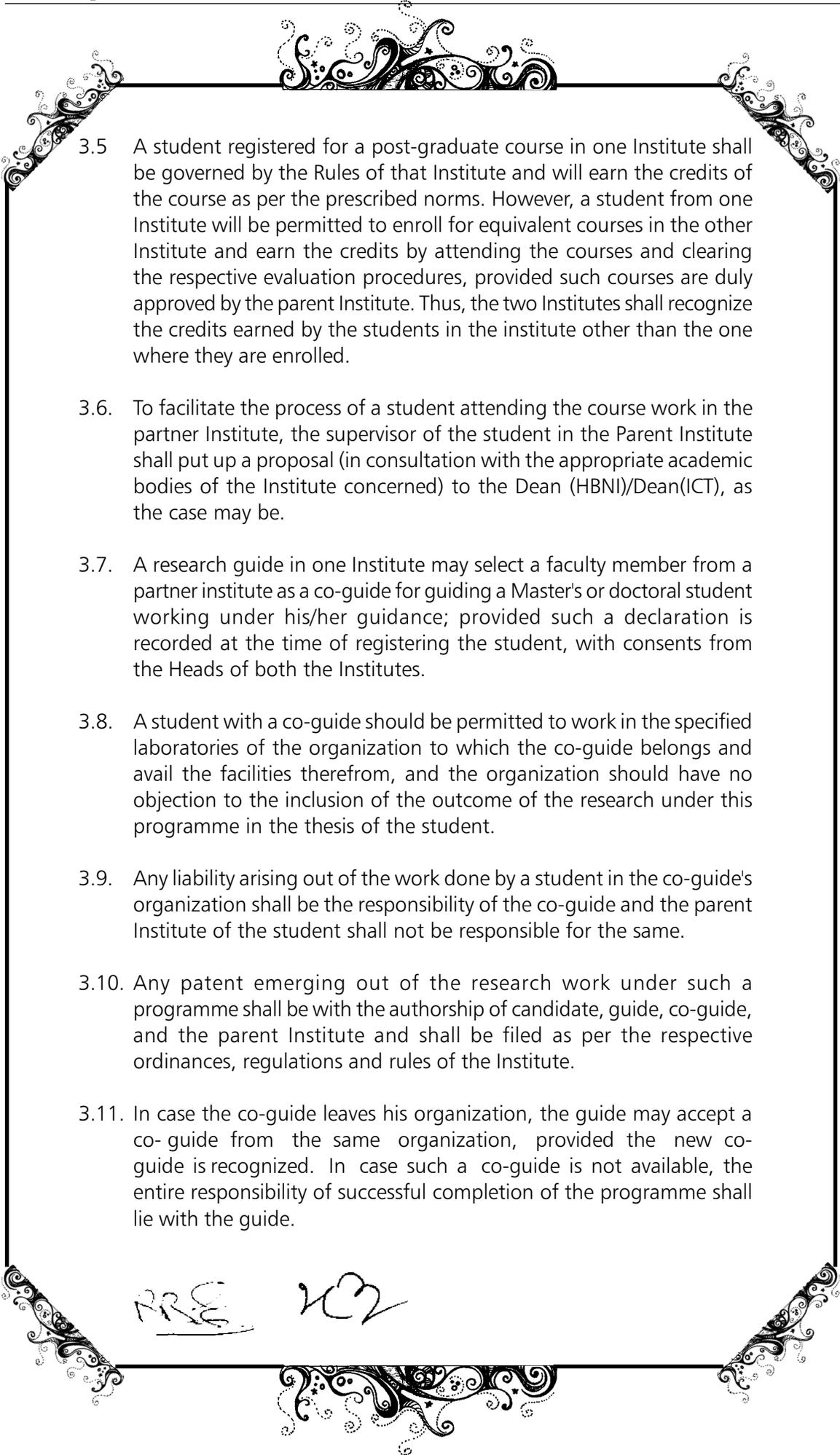
2. OBJECTIVE

To enhance collaborative research in the areas of mutual interest, both in extent and scope, by using the medium of research students enrolled in the Partner Institutes.

3. MODALITIES OF COOPERATION

- 3.1. The two Institutes shall recognize each other's research guides in the disciplines of common interests.
- 3.2. The identified faculty members of each Institute may function as Honorary Professors of the other Institute and may participate in the teaching programmes of the other Institute in honorary capacity, as per the Rules of the respective institute.
- 3.3. In order to share expertise, some seats may be given on priority basis to the faculty and students of the other Institute in the academic/research programmes of one Institute, which are mainly for the in-house persons and where limited access is available for persons coming from outside, such as training programmes, seminars, workshops, etc.
- 3.4. The research facilities at one Institute should be made available to the students/scientists/faculty of the other Institute through the involvement of research supervisors or the technology advisors, as per the norms of the respective institute.

Handwritten signatures and initials

- 
- 3.5 A student registered for a post-graduate course in one Institute shall be governed by the Rules of that Institute and will earn the credits of the course as per the prescribed norms. However, a student from one Institute will be permitted to enroll for equivalent courses in the other Institute and earn the credits by attending the courses and clearing the respective evaluation procedures, provided such courses are duly approved by the parent Institute. Thus, the two Institutes shall recognize the credits earned by the students in the institute other than the one where they are enrolled.
- 3.6. To facilitate the process of a student attending the course work in the partner Institute, the supervisor of the student in the Parent Institute shall put up a proposal (in consultation with the appropriate academic bodies of the Institute concerned) to the Dean (HBNI)/Dean(ICT), as the case may be.
- 3.7. A research guide in one Institute may select a faculty member from a partner institute as a co-guide for guiding a Master's or doctoral student working under his/her guidance; provided such a declaration is recorded at the time of registering the student, with consents from the Heads of both the Institutes.
- 3.8. A student with a co-guide should be permitted to work in the specified laboratories of the organization to which the co-guide belongs and avail the facilities therefrom, and the organization should have no objection to the inclusion of the outcome of the research under this programme in the thesis of the student.
- 3.9. Any liability arising out of the work done by a student in the co-guide's organization shall be the responsibility of the co-guide and the parent Institute of the student shall not be responsible for the same.
- 3.10. Any patent emerging out of the research work under such a programme shall be with the authorship of candidate, guide, co-guide, and the parent Institute and shall be filed as per the respective ordinances, regulations and rules of the Institute.
- 3.11. In case the co-guide leaves his organization, the guide may accept a co- guide from the same organization, provided the new co-guide is recognized. In case such a co-guide is not available, the entire responsibility of successful completion of the programme shall lie with the guide.

RRS 202

3.12. In addition to the recognized research supervisor, a student may be advised by a Technology Advisor, who need not be recognized Ph.D. Guide, from the other Institute. The Technology Advisor shall be a person of high repute in the area of research being pursued by the student. The Technology Advisor shall be chosen by a research guide, with consent of the Director. ICT and Director of the respective constituent Institution of the HBNI.

4 Implementation of the MOU:

4.1. This MoU shall become effective from the date it is signed by the Partner Institutes and shall remain valid for an initial period of five years. The agreement may be extended by mutual consent. In case one Partner Institute wishes to cancel the MOU, a written intent to that effect will have to be communicated by June of the year concerned. The MOU in that event will cease to be operative from the end of the academic year in question. However, any commitments already made under the MOU before its lapse or termination need to be fulfilled.

4.2. For the Implementation of this MoU, the following will be the contact persons.

From HBNI - Professor R.R. Puri, Dean, HBNI (Ex-officio)

From ICT- Professor S.D. Samant. Dean (Academic Programmes)

Signed on 5th Day of APRIL 2007

Professor R.B. Grover
Director

For and on behalf of
DR. R. B. GROVER
Homi Bhabha National Institute
Central Complex, BARC
Trombay, Mumbai-400085.

Witnessed by-

(1) Signature: _____

(2) Name: DR A. K. SURI

Professor J. B. Joshi
Director

For and on behalf of
Institute of Chemical Technology
DIRECTOR
INSTITUTE OF CHEMICAL TECHNOLOGY
UNIVERSITY OF MUMBAI
MATUNGA, MUMBAI - 400 019.

(1) Signature: _____

(2) Name: Prof S D SAMANT

Annexure - 7

Receipts & Payments - Account

For the financial year ending on 31.03.2008

**Receipts & Payments Account
For the financial year ending on 31.03.2008**

Payment	Amt.(Rs.)	Amt.(Rs.)	Receipt	Amt.(Rs.)	Amt.(Rs.)
Re-imbursment of tuition fees		7,082.00	Opening Balance	357,950.00	357,950.00
Bank Commission/Charges			Receipt/Admission/Registration fees	1,720,873.00	
Cost of Cheque Books	225.00				1,706,000.00
Collection charges on o/s cheques	148.00	373.00			
Honorarium (Shri Gharat)		5,000.00	Interest on savings Upto 30.06.07 Upto 31.12.07	3,278.00 14,873.00	18,151.00
Excess of Income over Expenditure		2,069,646.00			
(Represented by Bank Balance in a/c 3012832251-2 as on 31.3.08					
		2,082,101.00			2,082,101.00



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