

**NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR  
INDIA**

**37<sup>TH</sup> MEETING OF THE SENATE**

**HELD ON**

**13<sup>TH</sup> MAY, 2015**

**AT**

**11AM**

**AT**

**SENATE ROOM**

**MINUTES**

The 37<sup>th</sup> Senate meeting of NIT, Durgapur was held on 13<sup>th</sup> May 2015 at 11:00 A.M. at the Senate Room of the Institute.

The meeting was attended by the following members:

- |     |   |   |                 |
|-----|---|---|-----------------|
| 1.  | <b>Prof. T. Kumar,</b><br>Director,<br>N.I.T., Durgapur.                                  | - | <b>Chairman</b> |
| 2.  | <b>Prof. Apurba Dey,</b><br>Professor, Biotechnology<br>N.I.T. Durgapur                   | - | <b>Member</b>   |
| 3.  | <b>Dr. S.S. Mukhopadhyay,</b><br>HOD, Bio Technology<br>N.I.T. Durgapur                   | - | <b>Member</b>   |
| 4.  | <b>Dr. B.P. Mukhopadhyay,</b><br>Professor, Chemistry<br>N.I.T., Durgapur                 | - | <b>Member</b>   |
| 5.  | <b>Dr. Apurba Patra,</b><br>HOD, Deptt.of Chemistry<br>N.I.T., Durgapur                   | - | <b>Member</b>   |
| 6.  | <b>Prof. Partha Gupta,</b><br>Professor, Chemical Engineering<br>N.I.T., Durgapur         | - | <b>Member</b>   |
| 7.  | <b>Prof. Parimal Pal,</b><br>Professor, Chemical Engineering<br>N.I.T., Durgapur          | - | <b>Member</b>   |
| 08. | <b>Prof. J.P. Sarkar,</b><br>Professor, Chemical Engineering<br>N.I.T., Durgapur          | - | <b>Member</b>   |
| 09. | <b>Prof. Kartick Ch. Ghanta, -</b><br>Professor, Chemical Engineering<br>N.I.T., Durgapur | - | <b>Member</b>   |
| 10. | <b>Prof. Tamal Mondal,</b><br>HOD Chemical Engineering<br>N.I.T., Durgapur                | - | <b>Member</b>   |
| 11. | <b>Prof. Anup Kr. Sadhukhan,</b><br>Professor, Chemical Engineering<br>N.I.T., Durgapur   | - | <b>Member</b>   |
| 12. | <b>Prof. Showmen.Saha,</b><br>Professor, Civil Engineering<br>N.I.T., Durgapur            | - | <b>Member</b>   |



13.	<b>Prof. Dilip Kr. Singha Roy,</b> Professor, Civil Engineering N.I.T., Durgapur	-	<b>Member</b>
14.	<b>Prof. A. Das,</b> Professor, Civil Engineering N.I.T., Durgapur	-	<b>Member</b>
15.	<b>Prof. Soumya Bhattacharjee,</b> HOD, Civil Engineering N.I.T., Durgapur	-	<b>Member</b>
16.	<b>Prof. P. Ray,</b> Professor, Civil Engineering N.I.T., Durgapur	-	<b>Member</b>
17.	<b>Prof. Gautam Sanyal,</b> Professor, CSE N.I.T., Durgapur	-	<b>Member</b>
18.	<b>Dr. Mrs. Suchismita Roy,</b> HOD, CSE N.I.T., Durgapur	-	<b>Member</b>
19.	<b>Ms. Mousumi Saha,</b> HOD, Computer Applications N.I.T., Durgapur	-	<b>Member</b>
20.	<b>Prof. Mrs. Mousumi Roy ,</b> HOD,DMS N.I.T., Durgapur	-	<b>Member</b>
21.	<b>Prof Gautam Kr. Mahanti,</b> Professor, ECE N.I.T., Durgapur	-	<b>Member</b>
22.	<b>Dr. Banshi Badan Maji,</b> HOD, ECE N.I.T., Durgapur	-	<b>Member</b>
23.	<b>Prof. Sumit Kundu,</b> Professor, ECE N.I.T., Durgapur	-	<b>Member</b>
24.	<b>Prof. Rowdra Ghatak,</b> Professor, ECE N.I.T., Durgapur	-	<b>Member</b>
25.	<b>Prof. Siddhartha Sankar Thakur,</b> Professor, Electrical Engineering N.I.T., Durgapur	-	<b>Member</b>



26.	<b>Prof. S. P. Ghoshal,</b> Professor, Electrical Engineering N.I.T., Durgapur	-	Member
27.	<b>Prof. Subrata Banerjee,</b> Professor, Electrical Engineering N.I.T., Durgapur	-	Member
28.	<b>Prof. Aniruddha Gangopadhyay,</b> HOD, EES N.I.T., Durgapur	-	Member
29.	<b>Prof. P.P. Sengupta,</b> HOD, Humanities and Social Science N.I.T., Durgapur	-	Member
30.	<b>Shri Subhrabrata Choudhury,</b> HOD, Information Technology N.I.T. Durgapur	-	Member
31.	<b>Dr. (Mrs.) Seema Sarkar Mondal,</b> HOD, Mathematics N.I.T., Durgapur	-	Member
32.	<b>Prof. Mrs.Kajla Basu,</b> Professor, Mathematics N.I.T., Durgapur	-	Member
33.	<b>Prof. Manik Ch. Majumder,</b> Professor, Mechanical Engineering N.I.T., Durgapur	-	Member
34.	<b>Prof. Anup K. Saha,</b> HOD, Mechanical Engineering N.I.T., Durgapur	-	Member
35.	<b>Prof. Biswajit Halder,</b> Professor, Mechanical Engineering N.I.T., Durgapur	-	Member
36.	<b>Prof. Nilotpai Banerjee,</b> Professor, Mechanical Engineering N.I.T., Durgapur	-	Member
37.	<b>Prof. Amar Nath Mullick</b> Professor, Mechanical Engineering N.I.T., Durgapur	-	Member



38.	<b>Prof. Dipak Kr. Mondal,</b> Professor, Metallurgical & Materials Engineering N.I.T., Durgapur	-	<b>Member</b>
39.	<b>Prof. Swapan Kr. Mitra,</b> Professor, Metallurgical & Materials Engineering N.I.T., Durgapur	-	<b>Member</b>
40.	<b>Prof. Karuna Sindhu Ghosh,</b> HOD , Metallurgical & Materials Engineering N.I.T., Durgapur	-	<b>Member</b>
41.	<b>Prof. Amit Kr. Ganguly,</b> Metallurgical & Materials Engineering N.I.T.Durgapur	-	<b>Member</b>
42.	<b>Prof. Ajit Kr. Meikap,</b> Professor, Physics N.I.T., Durgapur	-	<b>Member</b>
43.	<b>Prof. Pathik Kumbhakar,</b> HOD, Physics N.I.T., Durgapur	-	<b>Member</b>
44.	<b>Prof. S. Chattopadhyay,</b> Department of Biotechnology NIT Durgapur	-	<b>Member</b>
45.	<b>Prof. B.N. Chakraborty</b> Department of Humanities and Social Sciences NIT Durgapur	-	<b>Member</b>
46.	<b>Shri A.K.Chattopadhyay</b> Deputy Registrar (Establishment) Registrar (I/c) Secretary of Senate NIT Durgapur	-	<b>Secretary</b>

Shri S. Chatterjee, Prof. A.K. Chakrabarti, Dr. M.Dutta, Prof. C.M.Narayan, Prof. K. Bhattacharya, Prof. A. K. Bhattacharya, Prof. V.K. Diwivedi, Prof. N.K.Roy, Prof. S.Ghosh, Prof. S. Dutta, and Prof. I. Basak, could not attend the meeting and were granted leave of absence.

The Chairman welcomed the Senate members to the meeting. The Chairman requested Shri A. K. Chattopadhyay, Registrar (I/c) to present the agenda of the 37<sup>th</sup> Senate meeting.



**Item No. 37.1: Confirmation of the Minutes of the 36<sup>th</sup> Senate Meeting.**

The minutes of the 36<sup>th</sup> Senate meeting held on 6<sup>th</sup> February, 2015 at 11.30 AM in the Senate Room of the Institute circulated to the members were confirmed by the Senate.

**Item No. 37.2: Action Taken Report**

The actions taken on the resolutions of the 36<sup>th</sup> Senate meeting held on 6<sup>th</sup> February, 2015 were noted by the Senate.

**Item No. 37.3: To ratify the resolutions of joint UGAC-PGAC meeting held on 09.02.2015 and to be held on 07.05.2015**

The resolutions of the Joint UGAC and PGAC meeting held on Joint UGAC and PGAC meetings held on 24.12.2014 and 14.01.2015 were approved / ratified.

The revised curricula of M Tech and M Sc were approved. The M Sc programme offered by department of Mathematics shall be renamed as: "M Sc in Mathematics".

**Item no. 37.4: To approve the award of PhD Degree.**

The Senate congratulated the following candidates and their supervisors for successfully completing all the requirements for the award of PhD degree and approved the award of PhD degree to the candidates in the next convocation.

SI No	Registration No.	Name of Candidate	PhD, Dept of	Supervisors	Date
1	NITD/MME/11/Ph.D/00309	R. Karunanithi	MME	Dr. S. Bera, Dr. K S. Ghosh	12.02.2015
2	NITD/PhD/CHEM/08/00151	Shah Jahan	Chemistry	Dr. R N Saha Dr. S. B. Das Dr. S. Feroz (CCoE, Oman)	24.02.2015
3	NITD/PhD/M/2011/00331	Samar Hazari	Maths	Dr. S. Kar Dr. J.K Dey (M Raj College) Dr. K Maity (M.G MahaVidyalay)	04.03.2015
4	NITD/PhD/PH/2011/00254	Arup KantiKole	Physics	Dr. P Kumbhakar	17.03.2015
5	NITD/PhD/BT/2010/00233	Vijayata Singh	BT	Dr S Chattopadhyay Dr A Nandi, JNU, New Delhi	19.03.2015
6	NITD/PhD/CHE/2011/00308	Swati Majumdar (Ghosh)	Chemical Engg	Dr. S. Halder Dr. P.K Chatterjee (CMERI)	20.03.2015
7	NITD/PhD/ECE/2011/00294	SouvikSingha	ECE	Dr. G. K Mahanti	23.03.2015
8	NITD/PhD/PH/2012/00358	SuparnaChakraborty	Physics	Dr. S. Sahoo Dr. B. Sahoo (T.D.B college)	24.03.2015
9	NITD/PhD/HU/2011/00326	Saptorshi Das	HSS	Dr. A. Modak	13.04.2015
10	NITD/Ph.D/ChE/08/00136	DebabrataMukhopadhyay	Chemical Engg	Dr J P Sarkar Dr. S. Dutta	21.04.2015
11	NITD/PhD/BT/2011/00270	SudipMondal	BT	Dr. A. Dey Dr. S. S Mukhopadhyay Dr. B.N. Mondal (CMERI)	27.04.2015
12	NITD/PhD/M/2010/00214	DebashisGhosh	Maths	Dr L. K Dey	29.04.2015
13	NITD/PhD/M/2012/00349	Utpalendu Adak	Maths	Dr L. K Dey Dr H K Samanta,	29.04.2015

				Arambagh College	
14	NITD/PhD/MME/2011/00310	Prasanta Kumar Rout	MME	Dr. K. S. Ghosh Dr. M. M. Ghosh	07.05.2015
15	NITD/PhD/MS/2010/00242	SomroopSiddhanta	MS	Dr. N. Banerjee (MS)	11.05.2015

**Item No. 37.5: To approve the registration for PhD Degree**

The Senate approved the registration for PhD degree of the following candidates.

SI No	Name	Dept	Supervisor(s)
1	THAFSEELA KOYA POOLAKKACHALIL	CC	1)DR.C.SARAVANAN , ASSIT.PROF.CC,NIT,DGP 2)DR.K.VIJAYALAKSHMI,SR.LECTURER, ELECTRICAL AND COMPUTER ENGINEERING CALEDONIANCOLLEGE OF ENGINEERING, OMAN
2	TAPAS KUMAR MAJI	EE	DR.PARIMAL ACHARJEE,EE, NIT,DGP
3	UJJWAL BISWAS	HSS	JAYDEEP BANERJEE,HSS,NIT,DGP
4	KOEL SAHA	Chemical Engg	DR.JAYA SIKDER,CHE,NIT,DGP
5	SHRUTIKEERTI KAUSHAL	MS	DR.AMLAN GHOSH,MS,NIT,DGP

**Item No. 37.6: To ratify the registration for PhD Degree**

The Senate ratified the registration for PhD degree of the following candidates.

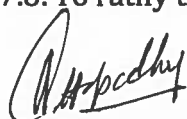
SI No	Name	Dept	Supervisor(s)
1	SATYA BHUSAN VERMA	CC	1)DR.C.SARAVANAN,ASSIT.PROF.CC,NIT,DGP-9
2	BISWAJIT DAS	CC	1)DR.C.SARAVANAN,ASSIT.PROF.CC,NIT,DGP-9
3	JOSE HORMESE	CC	1)DR.C.SARAVANAN,ASSIT.PROF.CC,NIT,DGP-9
4	AJAY JAMES	CC	1)DR.C.SARAVANAN,ASSIT.PROF.CC,NIT,DGP-9
5	BIJOY KUMAR MANDAL	ECE	1)DR.A K BHATTACHARJEE,ECE,NIT,DGP-9
6	ABHIJIT CHATTERJEE	CHE	1)DR.A.K.SADHUKHAN,CHE,NIT,DGP-9 2)DR.PRADIP KUMAR CHATTERJEE,CMERI
7	NILANJAN LAHARI	CE	1)DR.P.TOPADAR,CE,NIT,DGP-9
			2)DR.A.K.DATTA,CE,NIT,DGP-9
8	SANJAY SENGUPTA	CE	1)DR.A.K.DUTTA,CE,NIT,DGP-9 2)DR.P.TOPADAR,CE,NIT,DGP-9
9	UDAY CHANDRA MUKHERJEE	Dy. REGISTRAR (F & A )	1)DR.P.P.SENGUPTA,HSS,NIT,DGP-9
10	DEBARPITA CHAUDHURI	CC	1)DR.C.SARAVANAN,ASSIT.PROF.CC,NIT,DGP-9

**Item No. 37.7: To ratify the resolutions of 14<sup>th</sup> BOS (R) meeting held on 05.05.2015**

The Senate approved/ratified the resolutions of 14<sup>th</sup> BOS (R) meeting held on 05.05.2015.

1. Provision for awarding joint PhD degree with institution/ university having MoU with NIT Durgapur was accepted in principle.
2. The amendments in the PhD regulations were approved with following revision in cl. 3.1.2 "The maximum number of full-time research scholars that one supervisor can supervise, at any point of time, is eight, subject to the approval of DRPC. The candidates who have already submitted the thesis will not be included for the purpose."

**Item No. 37.8: To ratify the revision of rates of PhD scholarships in CFTI under GOI, MHRD**



The Senate ratified the revision of rates of PhD scholarships in CFTI under GOI, MHRD as per MHRD letter F. No. 17-2/2014-TS.1 dated 02.03.2015

**Item No. 37.9 To consider sanction of annual intake of 60 seats for Institute-sponsored Full-time PhD research scholars instead of existing sanction of total 120 seats**

The Senate accepted the same and recommended the matter to competent authority for consideration. The allocation of seats to the departments shall be made by the central PhD Admission committee.

**Item No. 37.10: To consider setting up a Sponsored Research & Consultancy Cell**

The Senate accepted the same and recommended the matter to competent authority for consideration. After the approval by the competent authority, a committee shall be constituted to prepare a detailed regulation for the cell.

**Item No. 37.11: To consider offering Foreign and Indian language courses to the students in collaboration with Visva Bharati**

The Senate recommended setting up "Centre of Language Studies" for offering certificate courses in Foreign and Indian languages like Japanese, Chinese, Sanskrit, Hindi and Bengali to the students and the faculty of the Institute in collaboration with Visva Bharati Dept. of HSS shall coordinate. Willing students and employees shall register for the course.

**Item No. 37.12: To inform the Senate of the progress made by Centre of Excellence on "Advanced Materials" set up under TEQIP-II**

The Senate noted the progress, a copy of which is attached (Annexure-I)

**Item No. 37.13: To inform the Senate of the progress made in the Helium and Geothermal Project**

The Senate noted the progress, a copy of which is attached (Annexure-II)

**Item No. 37.14: To consider the proposal of setting up a Centre for monitoring values, ethics and meditation programme, Vivekananda Chair Professor of Values, Ethics and Culture and School of Management and Social Sciences**

The Senate recommended setting up "Swami Vivekananda Centre for Values, Ethics and Meditation" and institution of "Swami Vivekananda Chair Professor of Values, Ethics and Culture" under the aegis of Dept. of HSS. The proposal to set up "School of Management and Social Sciences" was not considered by the Senate.





**Item No. 37.15: To consider a scheme of appointing Adjunct Faculty in line with the guidelines of MHRD (F No. 21-81/2014-TS-II, dated February 16, 2015)**

The Senate accepted the scheme and recommended it for consideration by the competent authority. The recommended norms are furnished in Annexure III.

**Item No. 37.16: To consider the matter of issues related to faculty recruitment**

Selection interview shall be made through Video conference for candidates from abroad.

Bank of panel of subject experts with Fellows of INSA, INAE etc. shall be created, wherever possible.

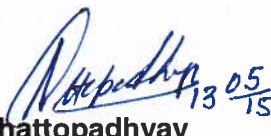
A seminar shall be delivered by the screened candidates in presence of selection committee members and faculty members of the concerned department, prior to the final interview by the Selection Committee.

**Item No. 37.17: Any other item with the permission of chair**

There was no other item for discussion.

The meeting ended with a vote of thanks to the chair.

  
**Prof. T. Kumar**  
**Director&Chairman, Senate**  
**NIT, Durgapur**

  
**A K Chattopadhyay**  
**Registrar (I/c) & Secretary, Senate**  
**NIT, Durgapur**

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Answer I

**National institute of Technology Durgapur**

**Centre of Excellence in Advanced Materials**


**Status Report as on May 2, 2015**

**Submitted to**

**Chairperson, BoG, NIT Durgapur**



**Prepared by**

  
**Dr. Amit K. Chakraborty**

**Coordinator,**  
**CoE in Advanced Materials**  
**N. I. T. Durgapur**  
Dr. Amit K. Chakraborty  
Coordinator  
Centre of Excellence in Advanced Materials  
National Institute of Technology Durgapur  
M. G. Avenue, Durgapur - 713209, India

### Time line of events:

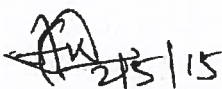
1. **November 2012:** Call for establishment of CoE by MHRD for setting up 30 CoE in India
2. **December 10, 2012:** proposal submitted by NIT Durgapur (prepared by me as the lead with significant contribution and active support of Prof. P Gupta, Prof. K. C. Ghanta, Prof. D. K. Mondal . In addition, ten faculty members from Physics & metallurgy departments showed interest in this centre who had helped by providing their CVs with this proposal.
3. **January 8, 2013:** Project defence by me at NPIU office at Noida
4. **April 4, 2013:** Selection of NIT Durgapur proposal for CoE by NPIU and release of funds (2 Crores released as first instalment of 5 Crores)
5. **May 7, 2013:** CoE formed with two coordinators-cum-Principal Investigators: Prof. D. K. Mondal as PI for work related to metals and me as PI for non-metals as per submitted proposal
6. **May 30, 2014:** Presentation by me at New Delhi at review meeting for assessing the progress of CoE by NPIU. The progress of our CoE was highly appreciated and it was advised to work more towards societal applications.
7. **November 14, 2014:** revision of plan for procurement was made with the approval of Director in which some pre-planned equipment were dropped and instead new equipment were planned which will help research directed more towards applications with specific emphasis on gas sensors, and solar cells research
8. **Dec 4-6, 2014:** First International Conference on Emerging Materials: Characterisation & Application was organised jointly with CSIR-CGCRI in Kolkata with 300 plus delegates

### Current status of CoE:

- **12 faculty members** from NIT Durgapur (4 from PH, 7 from MME, one from ECE)
- **2 Industry members (DSP) and one R&D organization member** (JBNSTS, Kolkata)
- **6 Ph.D. students** working for CoE (3 each in PH and MME)
- Organised **1 Short term course** with 30 participants for one week
- Organised **1 International Conference** on Emerging materials with 300 delegates
- **Five foreign visits** by CoE faculty members have been completed
- **Five National visits/conferences** by CoE faculty members have been completed
- **More than 20 conference papers and about ten journal papers published/accepted**
- Many other outreach activities by students such as attending conferences
- Financial support to characterize samples from outside institute to all CoE members

➤ **Expenses already incurred: ~38 lakhs**

➤ **Expenses committed within next 3 months: ~2.6 Crores in purchase of various equipment**

  
21/5/15

Dr. Amit K. Chakraborty  
Coordinator

Centre of Excellence in Advanced Materials  
National Institute of Technology Durgapur  
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## Sub-component 1.2.1 : Establishing Centres of Excellence

### 1. Objective:

To support establishment of Centres of Excellence for collaborative and multi-disciplinary research within specific thematic areas of regional or national importance.

### 2. Scope:

Establishment of about 30 Centres of Excellence (CoE) in Centrally Funded Institutions (CFIs), Government funded, Government aided and Private unaided Institutions for collaborative research will be supported in eligible Institutions out of those selected under Sub-component 1.2 and having the potential for undertaking applicable and collaborative research. An additional fund will be given for the same.

### 3. Strategy:


The strategy for establishing Centres of Excellence is as under:

- A Centre of Excellence (CoE) should be a collaborative activity on chosen subject amongst a team of high quality researchers in the Institution and researchers or research users in several Institutions/organisations.
- The CoE should further scale-up Postgraduate Education through increased enrolments for Masters and Doctoral programmes in topics closely linked to the thematic area of the CoE and therefore closely linked to economic and societal needs. Some of these students could also undertake their research within collaborating firms.
- The Centre should join faculty members from several departments around a common research programme, in which all the collaborating departments are expected to share their physical and intellectual resources with each other.
- The Centre should trigger an R&D culture in the Institutions as evidenced by significant increases in commercial applications and research outputs, collaborative and sponsored research, publications, patents, innovations, commercialized products.
- The Centre should aim to increase collaboration with National and International academic and research institutions/organizations. This will facilitate transfer of technology and knowledge to improve the quality of research and development, and aim to create a critical mass of researchers with potential for global research and development.

### 4. Deliverables:

The CoEs are expected to ensure the following deliverables:

- Increased collaborative and applied research as documented by:
  - Increase in external R&D funding, notably industry sponsored R&D projects and industry chairs
  - Increase in patents filed and obtained or other manners of knowledge commercialization and transfer
- Increased production of advanced human capital as measured by:
  - Increase in enrolment of Masters and Doctoral students
  - Increase in number of MTech/PhD Graduates
  - Increase in placement of graduate students and research staff in short- and long-term positions within collaborating firms as well as with local industry
  - Updated and more relevant undergraduate and postgraduate engineering curricula
- Developing long term R&D capability as evidenced by:
  - Increase in publications in refereed Journals
  - Increase in joint publications in refereed Journals with international authors
  - Increase in joint programmes/projects/exchanges with international research organisations and Institutions
  - External awards for research at the National and International levels.

  
13/5/15



## Helium and Geothermal Project at NIT Durgapur

Progress made during the period : July 01, 2014-April 30, 2015

### A. Objectives:

- (I) **Earthquake Precursory Study:** To monitor geochemical data from three different field laboratories i.e. hot spring site Bakreswar (W.B.), hot spring site Tatta Pani (J&K) and mud-volcano site at Baratang (A&N) in continuous and round the clock mode and to detect earthquake precursory signals through statistical and nonlinear analysis.
- (II) **Exploration of Helium and Geothermal Power :** To collect basic geochemical and geophysical data through monitoring of helium & radon profile and shallow depth resistivity survey and magnetotelluric survey in the geothermal area for exploration of helium and geothermal power at Bakreswar Tantloi geothermal area.

### B. Location of the project site:

- (i) Hot spring site Bakreswar (W.B.), (ii) hot spring site Tatta Pani (J&K) (iii) mud-volcano site at Baratang (A&N) and (iv) hot spring site Tantloi, (Jharkhand) and (v) headquarter at NIT Durgapur

### C. Progress made in research activities and upgradation of laboratories:

- (I) **Earthquake Precursory Study: Monitoring of multi-parametric and multi-station data** from three laboratories at hot spring site Bakreswar (W.B.), hot spring site Tatta Pani (J&K) and mud-volcano site at Baratang (A&N) were made to detect earthquake precursors. Geochemical data i.e. temporal variation (in 30 minutes interval) and seasonal variation in concentration profile of various gasses such as stable gases - He, Ar, O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub> and radioactive gases such as <sup>222</sup>Rn and gamma dose rate were collected at regular basis (24x7). Those data were recorded from two different sources (i) hydrothermal gas (hot spring gas and mud volcano gas (ii) Soil gas (1 m depth) simultaneously in each of the above mentioned station. Different equipment such as Alpha Guard Radon Monitor (concentration of hydrothermal radon), Barasol Radon Monitor & Rad 7 radon Monitor (concentration of soil radon) and Micro Gas chromatograph (concentration of (He, Ar, O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>) have been used for the said purpose of continuous measurement. Statistical and nonlinear analyses of the recorded geochemical data have been made to detect earthquake precursory signals. Significant anomalies (earthquake precursory signals) were identified at the laboratories at Tatta Pani (J&K) and Baratang (A&N) almost 5 days before the last 7.9M Nepal Earthquake on April 25, 2015.

Presently emphasis has been made to develop a Data Automation Software to redundant the manual data transfer facility to make the system faster and quick responsive. Moreover research work has been just initiated towards development of Seismo-geochemical algorithm through statistical and mathematical modeling of the multi-station and multi-parametric data.

- (II) **Exploration of Helium and Geothermal Power :** Helium and radon profile at hot spring gas of different hot spring of Bakreswar and Tantloi geothermal area were measured. Both the said parameters seem to be very high indicating the existence of the source of helium and geothermal reservoir in the study area. Radioactive gas radon was also measured at soil gases (1 m depth) at different locations of the study area.

### D. Development of skilled manpower:

- |   |      |
|---|------|
| (I) No. of ongoing Ph D Thesis work     | : 03 |
| (II) No. of ongoing M. Tech Thesis work | : 03 |
| (II) No. of ongoing M. Sc. Thesis work  | : 02 |

### E. Research publication:

- |   |      |
|---|------|
| (I) No. of publication in International / National SCI Journals   | : 02 |
| (II) No. of paper published in International / National Conferences by Ph D and M. Tech & M. Sc. Students | : 08 |
| (III) No. Invited Talk delivered  | : 04 |

### F. Seminar / conference attended and organized etc.:

- |  |      |
|--|------|
| (I) No. of Seminar / Workshop / Training Courses organized                                       | : 02 |
| (II) No. of Seminar / Workshop / Training Courses attended by Ph D and M. Tech & M. Sc. Students | : 02 |

### G. Initiation of research collaboration:

- |   |      |
|---|------|
| (I) No. of research collaboration initiated | : 09 |
|---|------|


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## H. Research proposal submitted for funding from external agencies

(I) No. of research proposal submitted for funding

: 03

## I. Procurement of minor equipment / chemicals / repairing job. AMC of equipment etc.

- Purchase Order released for procurement of 16 nos. batteries at Tatta Pani Laboratory, J&K
- Purchase Order released for procurement of 36 nos. books related with the subject of the project
- Tendering has been made for procurement of Spectro Photometer for analysis of geothermal water chemistry
- AMC has been made for maintenance of Micro Gas Chromatograph installed at three laboratories
- Quotation received from Germany for repairing and recalibration of Radon Monitor installed at various laboratories
- Annual Tariff has been made for VSAT Internet Link installed at three laboratories
- Different minor equipment such as pH meter, automatic 8 channel multiple probe temperature indicator with data logger, GPS, Gas Sampling bottles, Water Sampling bottles, chemicals etc. were also procured.

## J. Financial aspect of the project

Sponsoring Agency	Title of the Project	Period	Sanctioned Amount	Requirement for additional fund
MHRD (NIT Durgapur) Govt. of India	"Exploration of Helium and Geothermal Power at Bakreswar Tantloi Geothermal Area"  Project Manager - Dr. H. Chaudhuri Investigators - Prof. A. Gangopadhyaya, Prof. N. K. Roy & Prof. B. Sinha  Coordinator - Prof. T. Kumar, Col. (retd.) P. S. Sandhu	2014 - 2017 (3 yrs initially) as per Office Order vide	92.00 Lakh	60.00 Lakh for magnetotelluric survey and shallow depth resistivity survey at Bakreswar Tantloi geothermal area for exploration of Helium and geothermal power with one year extension upto 2018)
MHRD (NIT Durgapur) Govt. of India	"Earthquake Precursory Study at Bakreswar (WB), Tantloi, (Jharkhand), Baratang (A&N), Tatta Pani (J&K)"  Project Manager - Dr. H. Chaudhuri Investigators - Prof. A. Gangopadhyaya, Prof. N. K. Roy & Prof. B. Sinha  Coordinator - Prof. T. Kumar, Col. (retd.) P. S. Sandhu	2014 - 2015 (1 yr) as per Office Order vide	59.00 Lakh	one year extension with no cost upto July 01, 2016

## K. Plan of Action for the coming six month

1. To develop the strategy for magnetotelluric survey and shallow depth resistivity survey at Bakreswar Tantloi geothermal area to understand the reservoir characteristic for exploration of Helium and geothermal power in association with ISR, Gandhinagar and GSI, Kolkata in formal collaboration with (A) ISR, Gandhinagar and (B) GSI, Kolkata. **Invitation for collaboration already received.**
2. To make a formal collaboration with (A) NASA Ames Research Center, USA, (B) IISER, Kolkata and (C) ISR, Gandhinagar (D) NIT Srinagar for research activities on Earthquake Precursory Study. **Invitation for collaboration already received.**
3. To submit the research proposal for (i) **Center of Excellence for Geothermal Power** and (ii) **Center of Excellence for Helium** at MHRD as per the office order vide (Project Cost ~ approx 05 crore each)
4. To submit the research proposal to (iii) **DST FIST for Helium Isotope Mass Spectrometer** (Project Cost ~ approx 10 crore)
5. To revive the project submitted to MoES (Project cost ~ approx 22 crore).

All details are given in the Annexure I

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03/05/15

**Academic, Scientific and Technical Progress:****Ongoing Ph D Thesis work**

Sr. No.	Name of Student	Year	Title of the Dissertation
01	Mr Chiranjit Maji (Regular / Full Time)	Date of joining 23 02 2015	Proposed Title : "Investigation on Geochemical and Geophysical aspect of Geothermal Exploration at Bakreswar-Tantloi Geothermal Area "
02	Miss Tapapriya Gupta (Regular/ Full Time)	Date of joining 27 02 2015	Proposed Title : "Investigations on multi-parametric and multi-station based geochemical precursors for Earthquakes"
03	Mr Rahul Chatterjee (Part Time)	Date of joining 25 02 2015	Proposed Title : "Mathematical modelling of hydro-geothermal data to study the nonlinearity of geothermal reservoir"

**Ongoing M. Tech and M. Sc. Thesis work**


Sr. No.	Name of Student	Year	Title of the Dissertation
01	Mr. Samapan Bhadury	M Sc. in Physics Session 2013-2015	"Origin of Helium-3 in the earth's interior"
02	Miss Biva Sharma	M Sc in Physics Session 2013-2015	"Application of nonlinear techniques in geochemical and geophysical precursors for earthquakes"
03	Miss Kankana Seal	M Tech in Advanced Material Sci & Tech Session 2013-2015	"Mathematical modelling of hydro-geothermal data to study the nonlinearity of geothermal reservoir"
04	Mr Ritesh Kant Gupta	M Tech in Advanced Material Sci & Tech Session 2014-2016	"Application of geophysical and geochemical study in helium exploration at Bakreswar geothermal area"
05	Mr Ritwik Das	M Tech in Advanced Material Sci & Tech Session 2014-2016	"Geothermal Exploration at Bakreswar Geothermal Area"

**Research Articles published in National / International Journals**

Sr. No.	Title of Paper	Author(s)	Name of the Journal	Vol. & Year	pages
01	The Essence of Multifractal Detrended Fluctuation Technique to Analyse the Dynamics of Soil Radon Precursors for Earthquakes	Chiranjib Barman, Hirok Chaudhuri, Argha Deb, Debasis Ghose, Bikash Sinha	Natural Hazards	2015	Accepted
02	Multifractal Detrended Fluctuation Analysis of Seismic Induced Radon-222 Time Series	Chiranjib Barman, Hirok Chaudhuri, Debasis Ghose, Argha Deb, Bikash Sinha	Journal of Earthquake Science	Vol 1, 2014	1-21

**Paper publication in National / International Conferences**

Sr. No.	Title of paper	Co-author(s), if any	Name of the Conference	Date & year
01	Helium from geothermal sources	Hirok Chaudhuri, Bikash Sinha, D. Chandrasekharan	World Geothermal Congress 2015 held at Melbourne, Australia	April 19-25, 2015
02	Geochemical Precursor for Earthquake	Hirok Chaudhuri	International Conference on Decision Support Systems for Early Warning and Mitigation of Disaster held at NIT Durgapur, WB (International Conference)	December 28-30, 2014
03	Nonlinear technique adopted in earthquake precursor study	Biva Sharma, Ritesh Kant Gupta, Kankana Seal, Samapan Bhadury, Ritwik Das, Hirok Chaudhuri		
04	Helium Crisis	Samapan Bhadury, Ritwik Das, Kankana Seal, Biva Sharma, Ritesh Kant Gupta, Hirok Chaudhuri		
05	Geochemical Precursor for Earthquake	Kankana Seal, Ritesh Kant Gupta, Ritwik Das, Biva Sharma, Samapan Bhadury, Hirok Chaudhuri		
06	Analysis of earthquake precursors through FIT techniques	Ritesh Kant Gupta, Ritwik Das, Kankana Seal, Biva Sharma, Samapan Bhadury, Hirok Chaudhuri		
07	Analysis of earthquake through wavelet techniques	Ritwik Das, Ritesh Kant Gupta, Samapan Bhadury, Kankana Seal, Biva Sharma, Hirok Chaudhuri		


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08.	Multi-station and multi-parametric approach for the study of geochemical precursors for earthquakes	Hirok Chaudhuri	International Geo-hazard Research Symposium, held at NASA Ames Research Center, California	December 10-12, 2014
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#### Seminars/Short Term Courses/Summer Schools/Winter Schools organized at Bakreswar Laboratory

Sr. No	From	To	Name of the course	Sponsored / Self Financed	Number of Participants
01.	March 28, 2015	March 28, 2015	One day Workshop on Helium and Geothermal Exploration held at Helium Laboratory, Bakreswar	TEQIP - II, Govt. of India	34 (PG student of Math Dept.)
02.	January 18, 2015	January 18, 2015	One day Workshop on Helium and Geothermal Exploration and Earthquake Precursors Study held at Helium Laboratory, Bakreswar	Center of Excellence, Physics (TEQIP-II), Govt. of India	89 (PG student of Physics Dept.)

#### Seminar/Short Term Courses/ Summer School other than conferences attended by the Researcher working under Helium and Geothermal Project

S. No.	From	To	Name of the Institute/ Industry	Sponsored By	Name of the course	Name of the participant
01	May 25, 2015	May 30, 2015	IISER-Pune (Invitation received)	Indo-US Science & Technology Programme	Workshop: Time Series Analysis	Miss. Biva Sharma, M.Sc. Student
02.	March 23, 2015	March 27, 2015	Department of Applied Physics, Indian School of Mines, Dhanbad, Jharkhand	MNRE, Govt. of India	Short Term Course : National Training Programme on Advances in New and Renewable Energy Materials and Technology	Dr. Hirok Chaudhuri, Miss. Tapapriya Gupta, PhD Student & Miss. Kankana Seal, M. Tech Student

#### Invited Talks delivered

1. National Training Programme on Advances in New and Renewable Energy Materials and Technology held at Department of Applied Physics, Indian School of Mines, Dhanbad, Jharkhand during March 23 to 27, 2015  
*Exploration of Helium and Geothermal Power*
2. Short-Term course on "Experimental Techniques for Material Characterization (ETMC-2015) held at NIT Durgapur during February 27 to March 3, 2015  
*Measurement techniques of lighter and heavier compositions of a liquid or gas sample*
3. International Conference on Decision Support Systems for Early Warning and Mitigation of Disaster held at NIT Durgapur, WB during December 28-30, 2014  
*Geochemical Precursor for Earthquake*
4. Short-Term Course on "Recent Trends in Materials Science and Electronics (RTMSE - 2014) held at NIT Durgapur during December 10 to 14, 2014  
*Exploring Geothermal Power at Bakreswar*

#### Research collaboration

- *Geothermal exploration (shallow depth resistivity measurement) at Bakreswar-Tantloi*  
Collaborator: Dr. P. B. Sarolkar, Dy. Director General, GSI, Kolkata and Dr. Amit Roy, Director, GSI, Kolkata  
Informally initiated for exchange of research ideas and a report has been submitted by GSI.
- *Geothermal exploration (magneto-telluric survey) at Bakreswar-Tantloi*  
Collaborator: Dr. B. K. Rastogi, Director General and Dr. Kapil Mohan, Scientist, Institute of Seismological Research (ISR), Gandhinagar, Gujarat  
Informally initiated for exchange of research ideas and a research proposal report has been submitted by ISR.
- *Helium and Geothermal exploration at Bakreswar-Tantloi*  
Collaborator: Dr. D. Chandrasekaram, Chair Prof. Bombay IIT.  
Joint research articles have been published
- *Global Earthquake Forecasting System*  
Collaborator: Prof. Friedemann Frenud, NASA Ames Research Center, California, USA  
Informally initiated for exchange of research ideas.
- *Seismo-geochemical algorithm for earthquake precursors at Bakreswar (WB) and Tatta pani (J&K)*  
Collaborator: Dr. Supriya Mitra, Associate Prof. Dept. of Earth Sciences, IISER, Kolkata.  
Informally initiated for exchange of research ideas and geochemical and seismological data.
- *The Study of Earthquake Precursory Signals at Tatta pani (J&K)*  
Collaborator: Dr. Rajat Gupta, Director, NIT Srinagar  
Invitation has been offered by Director, Dr. Rajat Gupta, NIT Srinagar to visit NIT Srinagar for detail discussion.
- *Nonlinear Analysis on Earthquake Precursory Signals*

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**Collaborator:** Prof. Argha Deb, Prof. Physics Dept., Jadavpur University, Kolkata  
Joint research articles have been published and joint research proposal has been submitted

- **Nonlinear Analysis on Geochemical data**  
**Collaborator:** Prof. Sekar Iyengar, Senior Prof. SINP, Kolkata  
Joint research proposal has been submitted

- **Analysis on Earthquake Precursory Signals**  
**Collaborator:** Prof. Bikash Sinha, Dr. Debasis Ghose, Mr. Chiranjib Barman, Bose Institute, Kolkata and VECC, Kolkata  
Joint research articles have been published and joint research proposal has been submitted

#### Research Proposal submitted for funding

Sponsoring Agency	Title of the Project	Period	Amount	Status (Completed/on going)
SERB Govt of India, New Delhi	"Soil Gas Mapping for Geothermal Exploration in Bakreswar-Tantloi Area"  PI – Prof. Bikash Sinha, Co-PI- Prof. Sibaji Raha,, Co Investigators – Dr Hirok Chaudhuri, Dr. Debasis Ghose, , Dr. Sanjay Ghosh, Dr. Argha Deb  (Implementing Institution: Bose Institute & NIT Durgapur)	2015 –2017 (2 yrs)	94.44 Lakh	Submitted Under Review
SERB Govt of India, New Delhi	Research Project "Nonlinear Analysis of geochemical precursory signals for earthquakes"  PI – Prof. A. N. S. Iyengar, Co-PI – Dr. Hirok Chaudhuri  (Implementing Institution: Saha Institute of Nuclear Physics, Kolkata and NIT Durgapur)	2015 –2018 (3 yrs)	23.48 Lakh	Submitted Under Review
MoES, Govt of India, New Delhi	Research Project "Monitoring of Earthquake Precursor by $^3\text{He}/^4\text{He}$ Isotope Measurements"  PI – Prof. A. Gangopadhyay, Co-PI – Prof. N. K. Roy, CI – Dr. Hirok Chaudhuri, CI – Dr. Kalyan Adhikari,, CI-Prof. Bikash Sinha, CI – Dr. Debasis Ghose  (Implementing Institution: NIT Durgapur)	2014 –2019 (5 yrs)	2100.83 Lakh	Submitted & Defended Under Review

*Hirok Chaudhuri*  
03/05/15

**Dr. HIROK CHAUDHURI**  
Assistant Professor  
Department of Physics &  
Project Manager  
Helium & Geothermal Project  
National Institute of Technology  
Durgapur-713209, W.B., India

*A. Gangopadhyay*

**Proposed Norms for Appointment of Adjunct Faculty in line with the guidelines of MHRD (F No. 21-81/2014-TS-II, dated February 16, 2015)**

1. **Eligibility:** The eligibility for selection shall be as per cl. 3 and 4(a) of the above letter.
2. **Selection:** Selection procedure and appointment shall be as per cl. 3 and 4, 4(h).
3. **Duties:** Duties of the Adjunct Faculty shall be as per cl. 2(i) – (vii), 4(c), 4(f) of the above letter.
4. **Responsibility:** He/she must spend 4-6 full weeks in a semester and must take at least 40 lectures (for 4 weeks @ 10 lectures a week) / 60 lectures (for 6 weeks @ 10 lectures a week) other than research and project guidance.
5. **Honorarium:** He/she shall get an honorarium of Rs 30,000 per week, not exceeding Rs 1, 20,000 per month.
6. **Travel assistance:** He shall be provided travel assistance from his / her place of stay and back not more than three times in a semester.
7. **Accommodation:** He/ shall be provided free board and lodging in the Institute guest house.
8. **Other support:** He shall be provided with seating space and other support services in the department.
9. Remaining terms and conditions shall be as per the above letter.

