To

The Director,

IIT Kanpur

Approved

4-11-09

28th October, 2009

Sub.: Submission of IRDC report

Dear Sir

Kindly find enclosed herewith the executive summary (one page) as well as summary of major decisions and recommendations of IRDC. I have also enclosed all the minutes of the IRDC meetings, which were held during 2008-09. Both the executive summary as well as the terminal report was presented before IRDC members in its meeting held on 27th October, 2009 and IRDC recommended the report.

Kindly accord your approval, so that the above mentioned report can be disseminated to the academic staff of our institute.

Thank you.

Sincerely,

(Bikramjit Basu)

IRDC Convener, 2008-09

Indian Institute of Technology Kanpur
Institute Research and Development Committee

Executive Summary of IRDC meetings (2008-2009) and recommendations

The year of 2008-2009 was very eventful for the Institute Research and Development Committee (IRDC). The committee expanded its membership by including representations from students, Research Engineers and Project employees. A number of IRDC meetings were held in the last one year and the summary of the major recommendations/suggestions are provided in Section I. In some major IRDC meetings, Director, Deputy Director, Registrar, Deputy Registrar (Accounts), Assistant Registrar (R&D), Stores & Purchase officer, Audit officer, and Superintendent Engineer, IWD deliberated as well as participated in the discussion. After elaborate discussions, several decisions and recommendations were recorded. After each meeting, minutes were circulated to all IRDC members and subsequently, it was ratified. The minutes of all meetings are enclosed in Section II. The deliberations are classified below and summary of decision-recommendation is presented in additional pages (section I) along with few outstanding issues, which needs to be taken up in future IRDC meetings.

Major Decisions

- Review of recruitment procedures for project personnel, terms of appointments and policies for engaging persons on short-term or contract basis from time to time
- R & D document
- New RA hostel

1. *Major Recommendations*
   - Reforms /measures for improvement of the management of R & D activities.
   - Norms for the usage of major research equipment / facility
   - Promotion of research related activities of undergraduate students
2. *Major Activities*
   - Review of existing Centers
   - Evaluation of proposals for setting up new Research Centers at the Institute
3. *Research Vision*
   - Planning of major research initiatives
   - Evolution of long term vision of research and development activities.

Prepared by
Bikramjit Basu
IRDC Convener, 2008-09

Section I: Details of the IRDC decisions/deliberations recommendations (2008-2009)

Preamble: The Institute Research and Development Committee (IRDC), as conceptually approved by the Board of Governors of IIT Kanpur, consists of the Dean, Research and Development (ex-officio), one representative from each of the academic departments and interdisciplinary programs as well as two /three additional members from centers/ laboratories/ facilities, to be nominated by the Dean, Research and Development in consultation with the respective Head / Convener. The committee has expanded its membership by including representations from students, Research Engineers and Project employees. A detailed note on IRDC can be found at the weblink: **http://www.iitk.ac.in/dord/.**

Constitution of IRDC: Drs. K. Muralidhar (Chairman), B. Basu (Convener), Rajat Moona, S. Ganesh/Balaji Prakash, B. V. Phani, K. Poddar, A. Kushari, A. Agarwal, P. Munshi, A. Pradhan/Utpal Das, Nishith Verma, D. Kundu, J. Kumar, Anoop Singh, P. Bose, S. Sangal, S. Qureshi, P. M. Prasad/Kumar R. Priya, A. Chandra/S. Verma, V. N. Kulkarni, S. Roy, M. Sharma, Deepak Gupta, S. Sangal, P. Gupta, N. S. Vyas or his nominee, J. Subramaniam (representative of regular scientific/Design staff), Ms. Rashmi Parihar (representative of Project Associates working for sponsored projects) and Mr. K. Sudheendra Rao (representative of PhD students).

Major Decisions

Review of recruitment procedures for project personnel, terms of appointments and policies for engaging persons on short-term or contract basis from time to time: A proposal related to revision of salary structure was presented before IRDC members. IRDC members deliberated on Mapping of proposed/revised pay scale with the existing pay scale in terms of its rationale, justification, additional privileges (e.g. medical, housing etc.) and insurance. The creations of some new positions as well as the revision of 'work assignment' policy were also discussed. Based on the inputs from IRDC members, the salary structure as well as the entire document has been revised. Subsequently, the revised document is approved by Director and is now available on DORD website.

R & D document: Specific comments recorded during the discussion on R & D document include,

a. A brief version of the document that summarizes major points is desirable.

b. Administrative structure of the Institute needs to be included.

c. A section on how the new faculty can create and operate projects is required.

d. Reference to FIST proposals should be reconsidered.

The revised document is now ready for further discussion at departmental level.

New RA hostel: The issue of the need for increased accommodation for Project employees was discussed at different timeframes in IRDC meetings. After long discussion, IRDC unanimously agreed for immediate need of a new RA hostel with 100 rooms. IRDC also suggested that the Institute should plan for another RA hostel with 300 rooms for visitors of various types (including international guests/students).

1. Major Recommendations:

Reforms /measures for improvement of the management of R & D activities:

Various aspects of administrative changes at R & D office were discussed. It was mentioned that the office of Dean, R&D is currently handling 320 sponsored projects, worth of more than Rs 50 crores. A number of aspects of governance structure for R&D management were discussed in relation to research infrastructure development, human resource strategy for research staffing, strategy for research excellence as well as evolution of R&D division as a Strategic Business Unit (SBU) through a process of transformation. Several suggestions were made to ensure that DORD office will perform with a better speed and accuracy and as a result, each PI will be benefited.

- When no advance is to be drawn, PI can send an e-mail to DORD with a copy to respective Head, for project related journey approval. However, TA can be reimbursed to PI, subject to the availability of funds.

- HOD’s signature on purchase order form is not required for purchases of less than 4 lakhs.

- A number of IRDC members emphasized that the institute should procure state-of-the-art project management software. Director suggested that a coordinating officer at DORD will be available as an interface with office automation. The concept and details of the proposal entitled *Academic Administration System* (**AAS**) needs to be followed up.
- Also, the periodic training of staff members will be organized at regular interval and IRDC members as well as IME faculty members need to participate in such endeavourer.
- It was also suggested that e-mail statement for each Principal Investigator for individual project should be sent after each month.

Project related Purchases (indigenous and import): The existing purchase procedures related to Import and indigenous purchases were discussed. Among many aspects, various aspects related to procedural convenience, smoothness and fastness, import handling agency's performance, and role of office automation were highlighted. A model purchase proposal-cum-indent form is now available, which is expected to reduce the existing delay in procuring imported/indigenous equipments. If such proposal is followed, it can be ensured that PI will have the purchase order of an import item ready within 5 business days.

Issue of co-PI on sponsored projects: After a long discussion on the issue of co-PI in sponsored projects, the following recommendation is being proposed:

i. PIs are encouraged to have co-investigators in sponsored projects.
ii. Projects that are equivalent to awards (e.g., Swarnajayanti) will not have co-PIs.
iii. Consultancy projects can have a single project investigator.
iv. For DST proposals to be submitted to Engineering Sciences, it is obligatory to have Co-PIs.
v. In case of faculty/academic staff due to retire in the next four years, Co-PI is mandatory for DST proposals, irrespective of the discipline.
vi. All proposals will necessarily be forwarded first by the Head of the Department.

Safety and Maintenance of research labs: A long track record of accomplishments of Institute Works Department (IWD) in terms of creating large research facilities, like NWTF, Nanoscience initiative (Four clean rooms - class 10,000 and class 1000), Center

for Environmental Science and Engineering (rated as five star by TERI), Helicopter building, renovation of existing chemistry labs, liquid helium plant, Engine research Lab, Energy Conversion Lab, 4i Lab, Transportation Engineering Lab and lately, the Microfabrication Lab were presented to IRDC. After a detailed discussion, the following points emerged:

- Safety issue related to gas cylinders, Chemical disposal, Computer peripherals etc. are major concerns. IRDC opined that there is a need for safety officer on the campus to monitor the laboratory safety issues. This becomes increasingly important in the present time scale as a number of large scale equipments are currently available in the campus and this will be in the greater interests of the researchers and students.
- Bio-ethics committee needs to be formed as per requirement of Department of Biotechnology.
- Leakage problem frequently causing partial/full damage to research equipments and the solution can be the use of a transformer.
- Any request for lab maintenance related work needs to be forwarded by HOD.

Norms for the usage of major research equipment / facility:

The arbitrariness of the charges for CARE and other Institute Central facilities were discussed. A number of IRDC members encouraged rationalization, transparency and priority access/usage to PhD students need to be followed for all the CARE/Institute facilities. Also, faculty members responsible for such facility can be requested to provide justification (mentioning consumable expenses, AMC expenses and/or regular maintenance expenses, manpower) in support of the user charges.

- IRDC recommended that PhD students (whose forms have been forwarded by the respective Heads of Departments) should be given priority access with reduced charges. The charges towards the usage by PhD student for each facility should be paid from departmental budget. This is expected to create sufficient incentive for a rational use of the facility by PhD students.
- In conclusion, it was decided the user charges need to be reduced and be commensurate with the expense incurred on one hand and availability of resources with the users, on the other. In addition, it was recommended that the scientific details

(example, basic principles and technical specifications), availability and the basis of charge computation for CARE equipment be made available on a website. Such a website can provide information on non-CARE facilities as well. A detailed list of CARE facilities is currently available on the DORD website.

Promoting research related activities of undergraduate students:

The involvement as well as initiatives taken up by undergraduate students in various research related activities are mentioned and discussed.

- IRDC appreciated the students' initiative to publish NERD, the R&D newsletter of students. IRDC members appreciated the efforts to publish the magazine on a quarterly basis.
- The concept paper for the initiative to hold UG research conference during the Golden Jubilee Year was presented. After extensive discussion, IRDC expressed positive opinion and IRDC members suggested that (a) a faculty advisory committee should be formed to guide the students, (b) the possibility of online publication of the proceedings should be considered.
- Another initiative called, POWER was also discussed at the IRDC meeting and based on intense discussions, the idea was approved. Consequently, a website was launched at **www.iitk.ac.in/dord/power/.** An advisory committee has been constituted to mentor the POWER initiative.

2. Major activities:

Review of existing Centers:

In the last one year, seven existing Centers and two new centers were reviewed and the presentation files as well as detailed report are now available at **http://www.iitk.ac.in/dord/research_centers.htm.** In the following, major suggestions and recommendation for respective center are summarized.

a) Review of SAMTEL Center for Display Technology (SCDT)

The following suggestions were discussed during the review meeting:

2) An asset management company can be contacted to take care of the maintenance and security aspects of SCDT. In an era of *clean rooms*, this point becomes important.

3) Some of the western lab rooms can be converted to reprocessing and micro-fabrication facilities that SCDT can make use of.

4) Director suggested that one of the future focuses of SCDT activities should be in the area of solar energy, in particular organic solar cells.

b) Review of Center for Archeology Science and Technology (CAST)

The following major points were recorded:

1) The faculty members involved in CAST should offer elective courses and NPTEL courses in the general area of archeology.

2) One of activities can be in the area of development of indigenous technology in the domains of both software and hardware.

c) Review of the Nanotechnology Initiative

The following points emerged during the discussion:

i) A formal approval is required to create a name such as *Centre for nanotechnology*.

ii) Technical peer groups need to be formed. Members would comprise international experts from USA, Europe and Asia. A periodic review of activities of the group in nanotechnology is essential since the subject, internationally, is fast evolving.

iii) Ideally, the nanotechnology activities should include a broader spectrum of research, for example, nano-materials, nanocomposites, and nano-fiber based scaffolds for biomedical engineering applications.

d) Review of the SIDBI center:

The important points summarized are as follows,

- It was suggested that the donation from ’83 batch (~ 1.5 crores) can be partially utilized in sponsoring some product design related activities of the BTech students, who are associated with the existing companies of SIIC.

- Dr. Phani was suggested to convene a workshop for the enhancement of the interest of the IIT Kanpur faculty members to initiate start-up companies.

e) Review of the Prabhu Goel Research Centre for Computer and Internet Security:

It was mentioned that the official IIT K website is hacked by external users often and it was requested to devise ways on how such incident can be avoided.

f) **Review of the National Wind Tunnel Facility** (**NWTF)**

The following points emerged during the discussion:

- The IRDC committee members felt a need to constitute an academic advisory committee which will have representation from various departments within the institute as well as from outside academic and research institutions. Besides being a testing facility, about 30% of the time should be made available to the institute faculty and student members for their research. It was stressed upon that there is a need to consolidate the computational, instrumental and experimental components at NWTF.
- The committee members also opined that NWTF should have a professionally managed organizational structure which should have guidelines for administrative governance and other policy matters. It was emphasized that student involvement needs to be encouraged by hiring and training undergraduate and postgraduate students on short-term or medium term basis.

g) Review of Digital Innovation Lab (DIL)

The following major points were recorded:

- The committee members felt that it is important for the Digital Innovation Lab to have a broader vision. It was suggested that in addition to housing AutoDesk, DIL should also have an inventory of other software as well.
- It was also proposed that the lab should adopt the student-model of governance. For this, select students in each semester should be provided both in house as well as on-site training by AutoDesk personnel.

3. Evaluation of proposals for setting up New Research Centers

a) Ion Beam Center for Science and Futuristic Technologies: A number of faculty members from Physics and Mechanical Engineering presented their proposal on Ion beam Center. The formation of such center is expected to encourage intense interdisciplinary activities in the area of Photonic and device materials, MEMS and NEMS for space and energy related applications. IRDC members were quite enthusiastic about the creation of an Ion Beam Center at the Institute.

b) Center for Earth Systems and Climate Change Research: A number of faculty members across various Engineering disciplines (CSE, EE, ME, Civil, ChE), sciences (Chemistry, Physics) and Humanities and Social Sciences presented several focused research areas related to Climate Change and Earth Sciences. Currently, only two centers, one at Indian Institute of Tropical Meteorology (IITM), Pune and the other one at IISc, Bangalore are actively involved in studying climate changes. It is expected that IIT Kanpur can take a lead in this area with the formation of such an interdisciplinary group. It was mentioned that this center is involved in research activities, which will be complimentary to the existing activities of Center for Environmental Sciences and Engineering. After a detailed discussion lasting over one hour, IRDC overwhelmingly expressed appreciation and recommended that the proposal has the potential to form an interdisciplinary Centre on climate change research.

4. Research Vision:

Planning of major research initiatives:

Over the last five decades, the research ethos at IIT Kanpur has evolved from the conventional way of research being carried out as dissertations of graduate students, to individual research groups, sponsored projects, inter-departmental collaboration, to inter-institutional partnerships. In particular, the institute saw intense collaborations among the researchers from multiple disciplines and multiple institutes in last few years. It was mentioned that the Institute should take up large projects in the following areas: a) energy b) environment, c) materials, d) communication, e) computing (simulation) and g) health.

Two major initiatives on Solar Energy have been recently taken up a group of faculty members from multiple departments. The following are the recommendations of IRDC:

a) Inter-disciplinary research has led to the establishment of a few centers at IIT Kanpur. It is witnessed that research is rapidly getting concentrated in multi-faculty initiatives and centers that are endowed with state-of-the-art facilities. IRDC has taken a key role in reviewing the activities of such centers and also has nurtured the creating of some new centers. It is expected that in future, IRDC will play even a larger role to evolve policies which will nurture more intense interdisciplinary research activities of complex nature in IIT Kanpur. This will eventually lead to define *research programs* with a broader perspective in problem definition as well as implementation of projects in some key area of national and societal relevance.

b) IIT Kanpur has groomed several generations of students to pursue higher studies and adopt research as a professional career. The latest in this aspect is the enthusiasm and involvement of the undergraduate students in research. The importance that research enjoys as an activity is undeniably high. In last one year, IRDC promoted and encouraged the activities of undergraduate students in research oriented activities and hopefully, IRDC will continue to play this role so that more such activities will enable a large number of UG students to involve in meaningful research activities.

c) International collaboration, in particular, drawing internationals scholars to our campus is highly desirable. At present, a very small number of international students come to IIT Kanpur either to take specific UG courses or for part of their PhD work, e.g. as part of Indo-US joint centers or such similar activities. If IIT K would like to have more visibility in international scenario, IIT Kanpur should draw more international scholars.

d) A well-knit vision wherein ideas germinating in laboratories reach the market place along with a structure to administer the process is desirable.

e) IRDC should nurture large research programs, where we can provide leadership on a national scale. A few of such examples include solar energy, climate changes etc. Such projects are of substantial societal relevance.

f) The success of intense research activities also requires suitable and favorable administrative support from R & D office. IRDC is expected to suggest how to decentralize the work-load in R&D office by involving departments in managing staff

recruitment and contingency expenditure as well as to evolve policy changes to bring accountability/clarity as well as smoothness and fastness of R&D administration processes.

Evolution of long term vision of research and development activities

The strategy of IRDC would be to focus on developing new ideas which should create new research opportunities (inter/intra institute collaboration as well as to facilitate research with the available infrastructure). The proposal for Golden Jubilee Research Complex (GJRC) was discussed in to a large extent. Subsequently, the departmental input was sought. Along with the summary of all the inputs from various departments, it was mentioned that IRDC desires to strongly recommend the GJRC proposal for an in-principle approval from Board of Governors of IIT Kanpur. However, it was suggested that the formation to interdisciplinary research groups across the institute must commence so that the design of the building is linked to the requirement of interdisciplinary research groups. The construction of the building would take another year or more (upon Board's approval). It is important that these groups should start informal interaction and come up with clear thoughts on **complex** research problems of multidisciplinary nature. While a large funding from MHRD for the proposed GJRC is feasible, it was mentioned that some fraction of such funding can be spared to revamp existing research facilities and laboratory space.

Some Outstanding issues

Some outstanding issues, which can be addressed next year, are as follows:

a) Project Management Software: During last one year, the need for state-of-the-art Project management software was discussed. IRDC requested Dr. Phani to take up the initiative of developing an Academic Administration Software (AAS), which is expected to ensure smooth functioning of project related various transactions. This needs to be taken up on an urgent basis.

b) Awareness of SIIC activities: Departments are suggested to invite Dr. Phani for discussion on new initiatives of SIIC and activities related to IPR, Patent, and faculty entrepreneurship. Such discussions are expected to increase more enthusiasm among the faculty members.

c) PG Admissions to project employees: IRDC discussed the aspect of sponsorship of project employees for the M.Tech program. The following suggestions were made:

i) A sponsored candidate must have spent at least a year before applying for MTech admission.

ii) GATE score can be waived and research Assistantship for two years need to be ensured.

iii) Sponsored candidate has to appear in interview/written test as desired by selection committee.

The above issue was discussed at Senate and it was suggested that a modified proposal be brought to the floor of Senate for further discussion.

d) Keywords for Project Classification during registration: The need for project classification was discussed for better dissemination of information to the outside world as well as for archival purposes. In the project registration form, PI can mention relevant keywords as well as write a few lines of abstract (in layman's language – abstract for the tax payer) so that such information can be displayed against each sponsored project.

e) Faculty classification in terms of expertise in broad research areas: It was suggested that all IRDC members will compile information for the respective department/IDP about their area of expertise (broad, e.g. Energy, Environment, Materials, Simulation, Communication as well as narrow research domains) along with the contact details and compiled information will be useful for wider dissemination. A suitable search engine will use this database to generate responses to queries frequently received from the outside world. The departmental representative in IRDC is requested to follow up. The format is to be circulated by Convener, IRDC.

Prepared by
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IRDC Convener, 2008-09