

# Indian Institute of Technology Kanpur

## Research & Development @ IITK



Indian Institute of Technology Kanpur is engaged in providing meaningful education in engineering and science while conducting original research of the highest standard. It aims at leadership in technological innovation that would result in all round industrial growth. The Institute works tirelessly to provide state-of-the-art equipment to its faculty that, in turn, would support cutting-edge research in science and technology. Today, the Institute is well-recognized as one of the centers of academic excellence.

### Projects

Along with fundamental research, many Research and Development projects aim at solving problems of direct relevance to the needs of the industry through time-bound sponsored and consultancy projects. The focus is on:

- ✦ Basic research from nano and micro all the way to macro levels involving fabrication, transport processes and meaningful products.
- ✦ Providing leadership in energy technologies, communication systems, materials, and environmental engineering.
- ✦ Enhancing collaborative research with academic institutes and the industry.

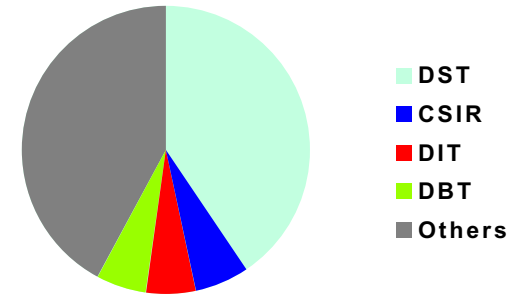
### Office of Research & Development

Office of Research & Development was set up to provide specialised administrative and managerial support for the operation of sponsored research, consultancy and other related research & development activities of the Institute. It facilitates interaction with external agencies, both national and international. It also promotes and manages Institute-Industry interaction and all externally funded research and development projects. The key role of the office of Research & Development is to provide a creative atmosphere in research and development activities of the Institute.

- Sponsored research:** The Institute encourages investigation of basic and applied areas of science and technology in the form of sponsored projects. Research grants for such projects are given by Government agencies and industries (both national and international). These projects are usually of 2-5 years duration with periodic appraisals, while research objectives and goals may be refined along the way.



Currently, about 111 sponsored projects are funded by various government, public, private sector organisations and international agencies. Some of them are Department of Science and Technology, Bio Technology, Indian Space Research Organisation, Aeronautical R & D Board, Ministry of Communication and Information Technology, Steel Authority of India Limited, Defence Research and Development Organisation, Indian National Centre for Ocean Information Services, Board of Research in Nuclear Sciences, INDO French Centre for the Promotion of Advanced Research, VLIR Belgium, British Council Division and UKIERI.



The accompanying graphical representation shows grants received from various agencies:

**b. Consultancy projects:** The Institute encourages its faculty members to undertake consultancy work which is an important tool in industrial growth of the country. Office of Research and Development acts as a liaison between the Institute and industry / government bodies to undertake consultancy projects with specific problems, which are generally of short duration. The office deals with the administration and management of such projects. Some of the industries where collaboration has been developed are SHELL, HPCL, Crumoz Inc., Zeus Numerix, and Forbes Mashall.

In addition, about 109 consultancy projects are being executed by the faculty and staff.

**c. Promotion of Institute-Industry interaction:** It provides helping hand in establishing collaborative research partnerships for undertaking creative and advanced research in emerging areas of interest to the industry.

**d. Initiation grants to new faculty members:** The Institute funds grant to new faculty for initiating research.

**e. Specialised workshops/conferences:** Workshops on cutting edge topics such as fuel cells, application of lidars and alternative fuels are frequently held in the Institute.

**f. Joint collaborative programmes with agencies in India and outside:** The Institute has signed several Memoranda of Understanding with Indian as well as international academic/research institutions and industries to strengthen its collaborative research effort.

**g. Technology Development and Transfer Mission:** The mission involves partnership with the academic institutions and the industry in development and marketing of important technologies and products. Mission projects on composite materials and railways have been successful.

**h. IITKREACH (REsearch And Challenges) Symposium:** The Institute has initiated series of annual symposium to showcase the ongoing research on campus and promote interdisciplinary research and interaction amongst faculty, students, and research staff of the Institute. Each year, the focus is on a few major themes of research in the Institute and faculty members working in these areas are invited to speak on their work in a way that is intelligible to a general audience. In addition, some students and distinguished external researchers are also invited. The participants of the symposium are from the Institute as identified by the Advisory and Organizing Committee.

**i. CARE Scheme:** Major research equipment in areas of research where a long-felt need exists, or for new thrust areas of research, is the main focus of the CARE scheme. The proposals of value 25 lakhs or higher will be funded. Proposals for purchase of research equipment are invited from faculty members drawn from across the Institute. It is desirable to have matching grants / partial grants from outside agencies for the purchase of the equipment. A few equipment purchased under CARE scheme are iCAP 6300 ICP Spectrometer, Terrestrial Laser Scanner, High Resolution Microscope, High Resolution ESI-MS (LC-MS) Facility, Drill Core Scanner, Thermal Analyzer, and RS-1 Rheometer.

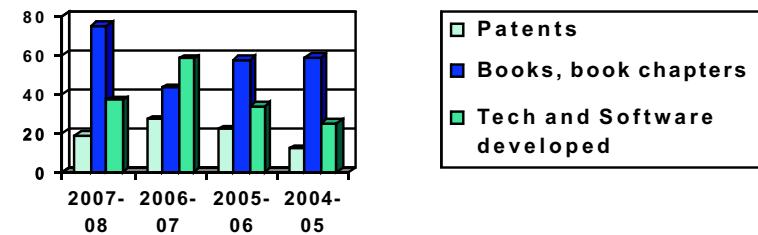
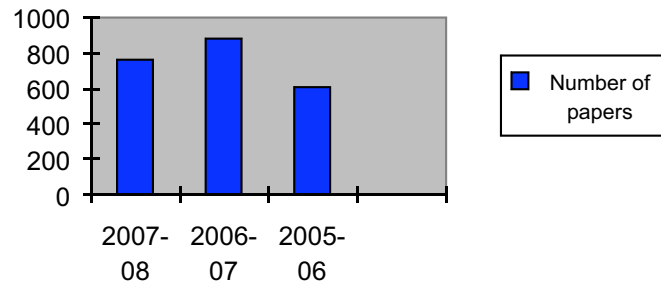


**j. Institute Lectures:** There is a tradition of organising Institute Lectures on topics of general interest, delivered by distinguished personnel with outstanding achievements.

**k. Facilities with FIST support of the Department of Science and Technology:** The Department of Science and Technology (DST) has a Fund for Improvement of Science and Technology (FIST) scheme to build infrastructure facilities in Universities and Higher Educational Institutions. The grant under this scheme is provided for strengthening infrastructure of the identified department in teaching and research and is to be spent exclusively for the said purpose. IIT Kanpur has received this grant regularly from DST.

### Achievements:

Faculty of the Institute participates in a wide range of activities beyond its academic and research commitments. They publish research papers in reputed national and international journals. The graph below shows the increasing trends in paper publications. Besides, faculty members register patents, develop technology, and software. The trends recorded over the past few years are shown below:



### Major Initiatives

Some of the current interdisciplinary research initiatives undertaken by the Institute include:

- ✍ Technology mission on railway safety
- ✍ Digital connectivity for rural areas
- ✍ Translation development for Indian languages
- ✍ Smart card and radio frequency identification
- ✍ Cyber security

### Thrust Areas

- ✍ Energy
- ✍ Environment
- ✍ Manufacturing
- ✍ Telecommunication
- ✍ Materials
- ✍ Simulation.

## Research Centers

The Institute operates several Centers in interdisciplinary areas. These are listed below:

Environmental Science and Engineering

BSNL-IITK Telecom Centre of Excellence: [http://www.iitk.ac.in/dord/BSNL\\_MoU.pdf](http://www.iitk.ac.in/dord/BSNL_MoU.pdf)

Prabhu Goel Research Centre for Computer and Internet Security: <http://www.security.iitk.ac.in/>

SAMTEL Centre for Display Technology (SCDT): <http://www.iitk.ac.in/scdt/aboutus.htm>

Nanoscience and Nanotechnology

Archaeology and Cultural Resource Management



Space Technology Cell: <http://www.iitk.ac.in/dord/isro/>

Railway Technology Cell: <http://tmrs.iitk.ac.in/tmrs/>

SIDBI Innovation and Incubation Centre (SIIC): <http://www.iitk.ac.in/siic/index.html>

Autodesk IITK Digital Innovation Laboratory (DIL): <http://www.iitk.ac.in/dil/>

National Information Centre of Earthquake Engineering (NICEE): <http://www.nicee.org/>

Media Lab Asia: <http://www.iitk.ac.in/MLAsia/about.htm>

3i Network/Infrastructure Research Cell: <http://www.3inetwork.org/>

HAL-IITK Cell

Uttar Pradesh Power Transmission Corporation Ltd (UPPTCL)

Computer Centre: <http://www.iitk.ac.in/cc/index.htm>

Advanced Centre for Materials Science (ACMS): <http://www.iitk.ac.in/acms/about.htm>

Centre for Laser Technology (CELT): <http://www.iitk.ac.in/celt/>

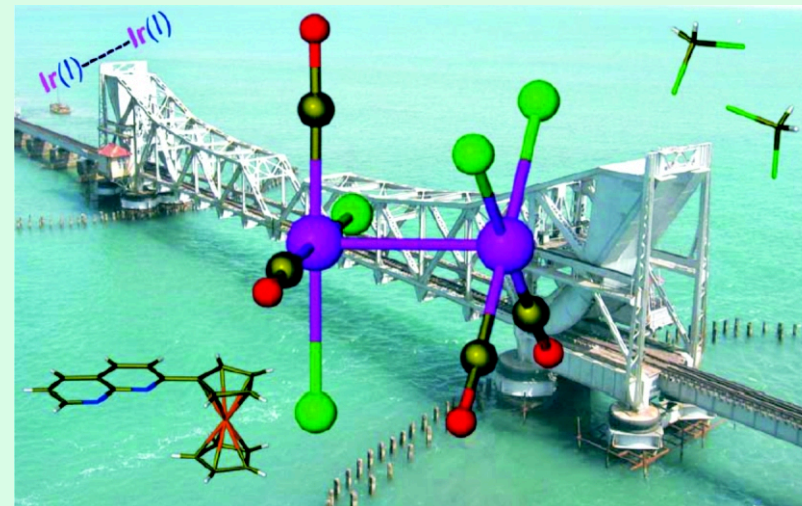
Centre for Mechatronics: <http://www.iitk.ac.in/robotics/>

National Wind Tunnel Facility (NWTF): <http://www.iitk.ac.in/nwtf/>

Facility for Ecological and Analytical Testing (FEAT): <http://www.iitk.ac.in/dord/feat.htm>

Advanced Centre for Electronic Systems (ACES)

Computer Aided Design Laboratory: <http://www.iitk.ac.in/cad/>



Oxidative additions of dichloromethanes to a diiridium(I) core, bridged by 2-ferrocenyl-1,8-naphthyridines (NP-Fc), provide an iridium(II) dimer,  $[\text{IrCl}_2(\text{CO})_2(\eta^1\text{-NP-Fc})]_2$ , featuring an unsupported Ir-Ir single bond (2.7121(8) Å). Source: Dr. Jitendra Bera's research published in ChemComm, Number 22, dated 14 June 2008, Pages 2485-2576



Engine Exhaust Particle Sizer (EEPS) Spectrometer, Model 3090



ISCO Density Gradient Systems



Hot Isostatic Press AIP6-30H



Soil Analyzer MCI 110 Embedded System

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