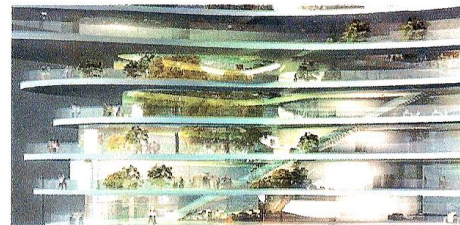


**CONCEPTUAL MASTER PLAN FOR
BHAUMIK INTERNATIONAL CENTER
FOR ADVANCED RESEARCH (BICAR)
IIT KGP AT KOLKATA**



Based on the concept of Urban-Farm, the skyscraper reveals a glimpse of the internal green core reinforcing its continuing dialogue with nature.



Concept & Roadmap for Establishing an International Research Center at Kolkata
A Joint Proposal by IIT Kharagpur and Dr. Mani Bhaumik Foundation

An Overview Document

1. Background:

Alumnus of IIT-KGP, Dr. Mani Lal Bhaumik is a physicist, internationally bestselling author, celebrated lecturer, entrepreneur, and a philanthropist. Most importantly, he is an inventor who understands the impact of innovation on people's lives. His early contributions to laser technology are exemplified in the development of the excimer laser. As the leader of Northrop Grumman's Research and Technology center, Dr. Bhaumik conducted pioneering research in high energy lasers and new laser systems. He invented the successful and the world's first efficient excimer laser in May 1973. Subsequently, it found extensive use as the type of laser that made possible the immensely popular Lasik eye surgery, eliminating the need for glasses or contact lenses in many cases requiring vision correction.

Being both an inventor and a philanthropist, and most importantly being a Kgpian, he seeks to help KGP to become a driving force in creating a culture of innovation in the eastern region of India through establishing leading edge R&D facilities and initiatives. His foundation has a 15 acre land in the heart of Kolkata which he would like to donate to IIT-KGP to create a world class research center to make an impact in the region. Creating such an R&D center of scale and focus requires help from stakeholders like central government, state government, leading researchers, corporations and funding agencies. Dr. Bhaumik, with the help of KGP, is willing to engage stakeholders to make his vision a reality.

Based upon Dr. Kakodkar's report on IITs to next generation of progress, the government of India is positioning older IITs to become research oriented educational institutions. This transformation requires different set of people and resources. Being a pioneering IIT, KGP could take a lead in establishing needed R&D infrastructures within the educational institution framework. Establishing a focused R&D center at a major metropolitan area not only expands KGP's reach but also provides access to international researchers as well as its students to participate.

The proposed R&D center will foster post-graduate research, granting master and PhD degrees in accordance of curricula of IIT-KGP. The research personnel of the center will interact with the faculty and students of IIT-KGP. The R&D center will cultivate global collaboration and exchange programs with the relevant institutions as an integral part of its activities. The R&D center will also promote close collaboration with the industrial sector.

2. Research Center Vision and Mission:

Vision

To pursue pioneering research and development in science and technology that can significantly improve and equitably sustain the quality of life and environment.

To position IIT-KGP and WB to take a pioneering role in R&D as India is transitioning from a 'market economy' to an economy driven by 'innovation'

Mission

The mission is to create a center of excellence in research for achieving world class, cutting edge, innovation oriented in the most crucial and fruitful topics in science and technology under the auspices of IIT-KGP

- To carry out research and development in key emerging areas that lead to impact-making innovations for future generation technologies;
- To translate latest scientific developments into useable technologies that can bridge the technological divide to significantly improve the quality of life and equally empower large sections of people in India and the world;
- To create vibrant and creative scientific environment through bright dedicated people, quality infrastructure and enriching collaboration;
- To share resources and work closely as an extended arm of IIT Kharagpur in the creation of niche technology, dissemination of knowledge and development of next-generation talent.

3. Research Areas:

Salient Principles and Attributes:

- The Research Centre shall work on a set of key thrust areas of national and international relevance to be developed over a period of time in a manner that complements the available strengths of IIT Kharagpur helping bring about a step jump in the quantum of quality research that is possible through mutually enriching interactions. The thrust areas shall be niche and well-defined instead of a being very broad based theme requiring holistic combination of both fundamental as well as applied research to make an initial impact through reasonable resources.
- Each thrust area will be developed as a niche vertical and will have linkages with the relevant research groups in IIT Kharagpur as well as other verticals in the Centre by setting up the required complementary state-of-the-art research facilities and including a highly competent leader of national /

international reputation and dedicated core research staff who may be selected from all over the world. A given thrust area will have a well-defined research roadmap including scientific goals, development initiatives and targeted innovations.

- Funding for the research will be met from the available interest of the corpus as well as from competitive grants that may be obtained from outside agencies, in collaboration with IIT Kharagpur and maybe partially independently in the long run.
- The Research Centre shall engage in collaborative initiatives with various institutions, organizations, industries and people at large to meet its mission and goals.
- The outcome shall be measured through the level of impact making publications, generation of valuable intellectual property, translation of technologies developed and spawning of enterprises.

Initial Thrust Areas

1. Bio-Medical Informatics:

This unit shall work on the convergence of biotechnology and medical sciences with computational biology, informatics and virtual reality to open new vistas in next generation medical science that enable discovery of new drugs, low-cost high-quality personalized yet scalable healthcare, advance public health research enabling prevention, early detection and containment of diseases, new age food sciences, new modes of medical science education, etc.

This unit shall identify its niche goals in the medium and long term and may work closely with Departments/ Schools of Medical Science &

Technology, Biotechnology, Chemistry, Computer Science & Engineering, Information Technology, Advanced Plant Genetic Engineering, Agriculture & Food Engineering, Material Science Centre, as well as the planned Dr. B. C. Roy Institute of Medical Sciences and Research at IIT Kharagpur.

2. **Sustainable Energy-Oriented Technologies:**

This unit shall devote its efforts in developing new age low-cost sustainable energy covering aspects of (but not limited to) energy (mainly solar) harnessing/ conversion, energy storage (batteries), transmission and low-cost access, each covering aspects of materials, processes, devices, electronics and products. A key goal will be to develop not only intellectual property but also help in ensuring large-scale deployment, especially in rural India.

This unit shall identify its niche goals, sub-groups and may work closely with the Departments / Schools of Electrical Engineering, Electrical & Electronic Communication Engineering, Mechanical Engineering, Metallurgy & Materials Engineering, Chemical Engineering, Biotechnology, Materials Science Centre, P K Sinha Centre for Bio-Energy as well as the upcoming Energy Science & Engineering Department in IIT Kharagpur.

3. **Nanoscience and quantum Physics:**

Nanoscience as defined by a size of 1 to 100 nanometers is naturally very broad, including fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, microfabrication, etc. The associated research and applications are equally diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to direct control of matter on the atomic scale. This definition reflects the fact that quantum mechanical effects are important at this quantum-realm scale. Therefore,

a comprehensive, associated study of the relevant quantum physics needs to be an essential part of the program.

Nanoscience and technology represent a fundamental change in the way we interact with the natural world, and is set to deliver major scientific and technological advances. The massive global investment in nanotechnology has effectively created an interdisciplinary environment that bridges the diverse fields of chemistry, physics, materials science, biology and engineering. Our initial focus will be on:

- modelling of nanomaterials
- characterisation of nanomaterials
- supramolecular chemistry of nanomaterials
- optical, electronic and magnetic properties of nanomaterials
- Nanotubes and nanorods

4. Strategic Benefits to KGP, Kolkata, WB and Eastern Region:

KGP Benefit:

Research Center (also known as R&D center) will help KGP gain reputation as a research educational institution. Helps provide access to research laboratories for both students and faculty as well as improve the stature of their standing in their fields.

As KGP is also contemplating establishing a Technology Park in Kolkata to house industry and help incubation of nascent companies, the combination of Research Center and Technology Park would create a unique synergy to foster innovation. This will help consolidate KGP's status as a pioneer.

Having both these centers in Kolkata combining the strength of Kolkata's location and IIT_KGP's academic excellence could become a potent force to

attract both international recognition, industry participation as well as a prime choice for top students.

Kolkata and WB Benefit:

Having an expanded IIT-KGP presence by having both Research Center and Technology Centers of international standards in Kolkata makes this region become a potential ‘innovation’ hub attracting other research centers.

Becoming a leader in ‘innovation’ renaissance, India has progressed through agricultural, manufacturing, information technology revolutions. As India is trying to establish its next top position in global economy, transformation from a ‘market’ economy to ‘innovation’ based economy is critical. This ‘innovation’ based revolution’s primary drivers are R&D infrastructure and entrepreneurial support systems. KGP could provide both these drivers for Kolkata and WB not to miss this ‘innovation’ renaissance.

As these centers attract other supporting research facilities, Kolkata becomes a ‘go to’ place research and innovation hub creating very high end jobs as well as numerous downstream jobs.

Most of the industry’s growth depends upon its research for developing new products and services. R&D hub would attract industries that are dependent on new product and service creation, to set up their facilities in proximity to the hub thereby creating new employment opportunities in the region.

Taking the pioneering role in creating an innovation based economy for the eastern region, West Bengal will have the opportunity to become a role model for the rest of the country and other developing economies of the world. It would have extremely positive social and economic impacts all over the world.

5. Key Stakeholders:

IIT-KGP, Ministry of Human Resource Development, Govt. of India and Mani Bhaumik Foundation

6. Other Salient Requirements:

➤ Organizational and Governance outline

Even though there are many models for the governance of such Research Centers, the basis for this Research Center governance are:

- To be integral part of KGP to benefit both students and faculty
- To have operational independence needed to attract world class researchers.
- To create an organization which is conducive to become a world class organization as well as financially independent.

The proposed Institute will be an integral part of the Indian Institute of Technology, Kharagpur and its functioning will be governed by the Acts and Statutes of IIT Kharagpur. To take care of the special nature of the Research Center, it will have an organizational structure of a corporation managed by a CEO. The CEO will be selected by its Board of Directors whose twin goals are to make it financially self-sufficient and to enhance the stature of IIT Kharagpur.

The Research Center Board will consist of nine members of which five to be appointed by IIT-KGP and four to be appointed by a separate board of Advisors Council comprised of eminent researchers from both academic and corporate sectors. This will ensure that KGP will have control and at the same time preserves the needed organizational autonomy for such Research Center.

1. Director, IIT Kharagpur – Chairman
2. Dean of SRIC
3. Dean of Institutional Development and International Relations
4. Two eminent people appointed by the KGP Board

5. Four Academic and corporate nominees from the Advisory Council of the Research Center

The Research Advisory Council's membership consists of eminent researchers, academics, and industry and government leaders appointed by the initial stakeholders. One third of the members will be rotated every two years to get new thinking and exposure to current developments. Every two years new members will be nominated by Advisory Council members. The recommendation of the Advisory Board will be sent to the Board of Governors of IIT Kharagpur for its consideration and approval.

While the Research Advisory Council would have no determinative powers, it would provide advice to the Board concerning research priorities and strategies or any other matter requested by the Board. Also the Advisory Council members works with the KGP Institutional Development people for fundraising and other support functions.

- Budget: USD 200 Million (Approx. Rupees 1000 Crores)
- Initial Funding sources (Alumni, MHRD, State Govt., Int'l bodies like ADB and Industry)

7. Next Steps:

Here are details of next steps as well as funding required for the next steps. Some of these tasks are to be conducted simultaneously.

- MOA between KGP and Mani Bhaumik Foundation
- Launching of International R&D Center with the Diamond Jubilee Celebration by the Honorable Prime Minister
- Detailed Project Feasibility Study with Project Cost Estimates
 - Project Implementation Roadmap
 - Identification of Sources of Funds for long-term sustainability
- Fundraising